

cinefex

number 29
\$4.95
Canadian - \$7.50



cinefex

...the journal of cinematic illusions

editor & publisher
Don Shay

associate editor
Janine Pourroy

contributing editors
Adam Eisenberg
Jody Duncan Shay

editorial assistant
Ann Dredla

CINEFEX 29 — February 1987. Published quarterly at P.O. Box 20027, Riverside, California 92516. Subscriptions (U.S.): four issues — \$15; eight issues — \$25; twelve issues — \$35. Return postage must accompany all unsolicited manuscripts, photos or other materials. Printed by Valley Printers, Riverside, California; color separations by Vivicolour, City of Industry, California. Contents copyright © 1987 by Don Shay. All rights reserved. Reproduction in whole or in part without written permission is prohibited.

Humpback to the Future 4

From deep space to deep waters, *Star Trek IV: The Voyage Home* engages the ever-stalwart crew of the U.S.S. *Enterprise* in a humanistic quest that begins and ends in the twenty-third century but unfolds for the most part in modern-day San Francisco. Along with its customary quota of spaceships and transporter beams, the latest adventure called for a representation of the planet Vulcan, a unique time travel effect, major storm sequences on earth and a totally convincing simulation of two humpback whales. *Article by Jody Duncan Shay.*

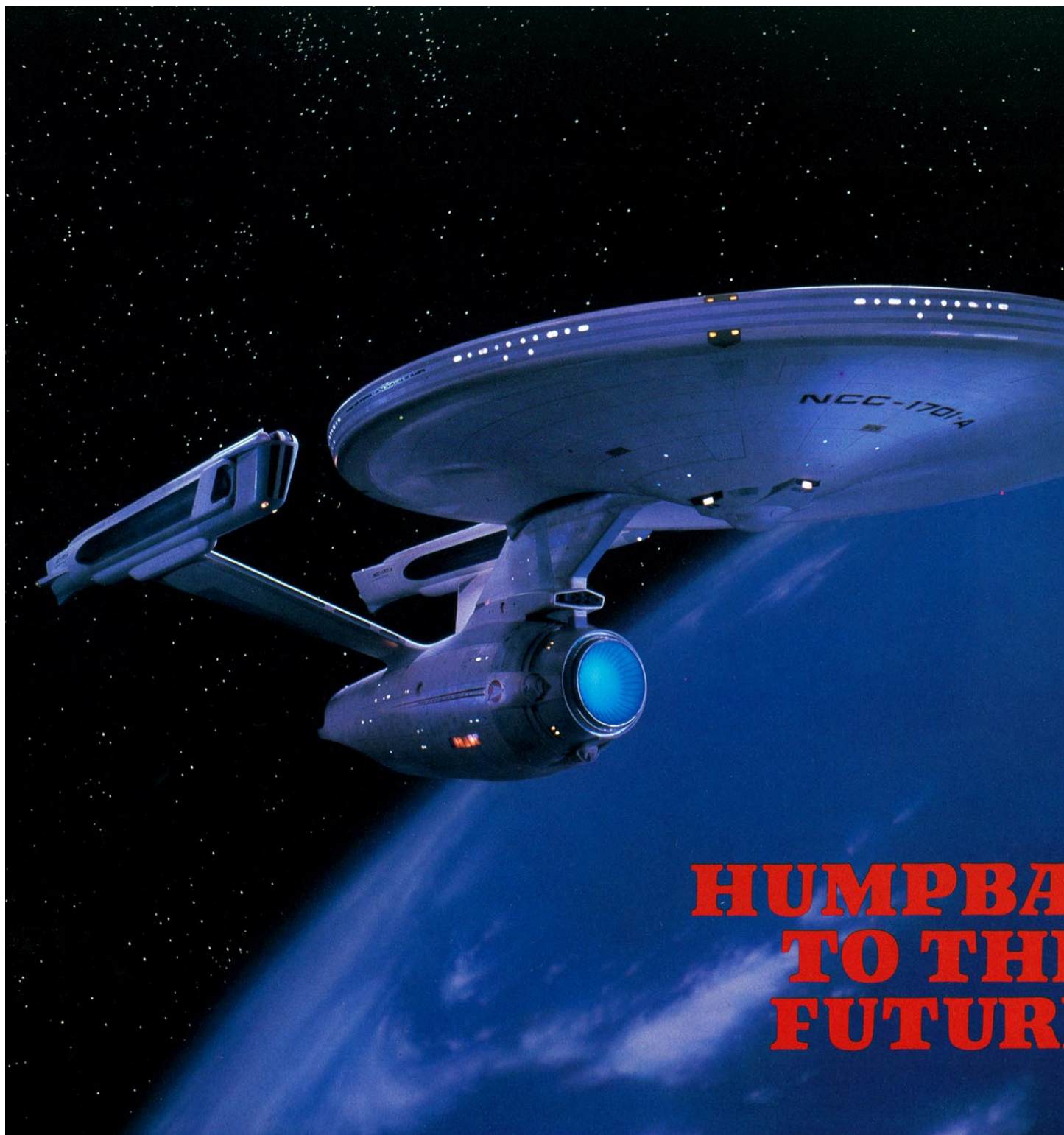
After the Fall 32

Forty-three years after toppling from the Empire State Building, King Kong was called upon to take an even greater tumble from the World Trade Center. Now, another decade later, the long-suffering ape has been resurrected once more for *King Kong Lives* — again as an ape-sulted actor augmented by full-size mechanical artifacts. Discussing their work on the film are creature creator Carlo Rambaldi, production designer Peter Murlon, visual effects supervisor Barry Nolan, and model shop supervisors David Jones and Dave Kelsey. *Article by Janine Pourroy.*

Sky Wars 52

Even with full support from the U.S. Navy, the producers of *Top Gun* realized that some of the sequences planned for their film would have to rely heavily on special effects. To create crash scenes and aerial explosions that would simulate actual air-to-air photography and intercut convincingly with live-action flight footage, visual effects supervisor Gary Gutierrez and his USFX organization launched an intensive campaign employing large-scale miniatures, outdoor settings and innovative pyrotechnics. *Article by Ed Martinez.*

FRONT COVER — A disabled Klingon ship makes a crash landing in *Star Trek IV*.
An air-to-air missile strikes a MIG fighter in *Top Gun* — BACK COVER.

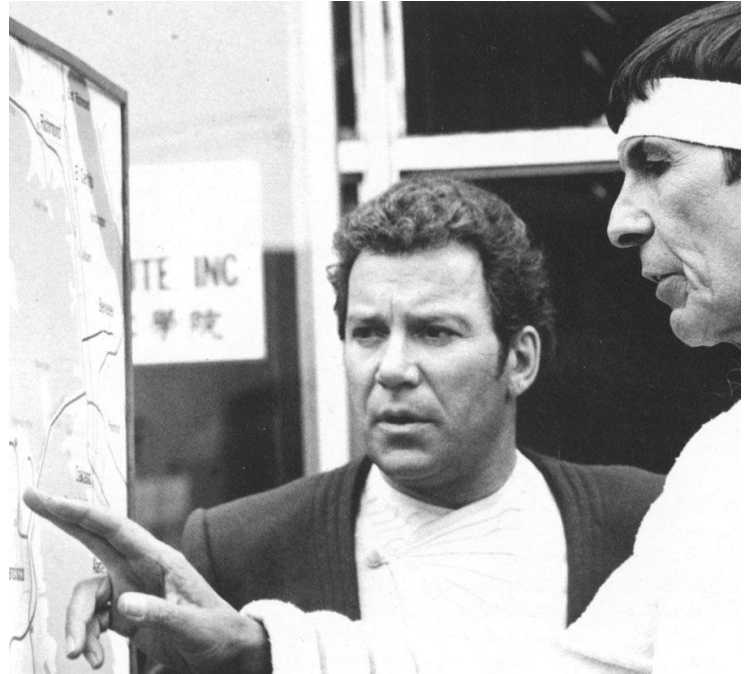


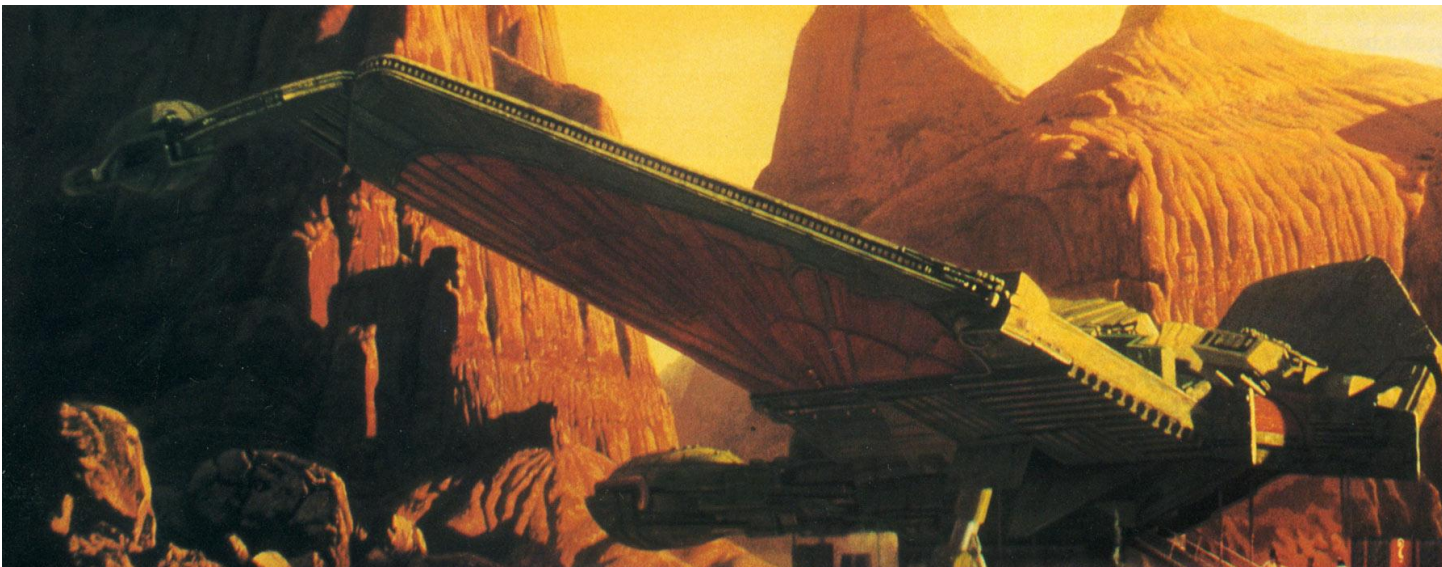
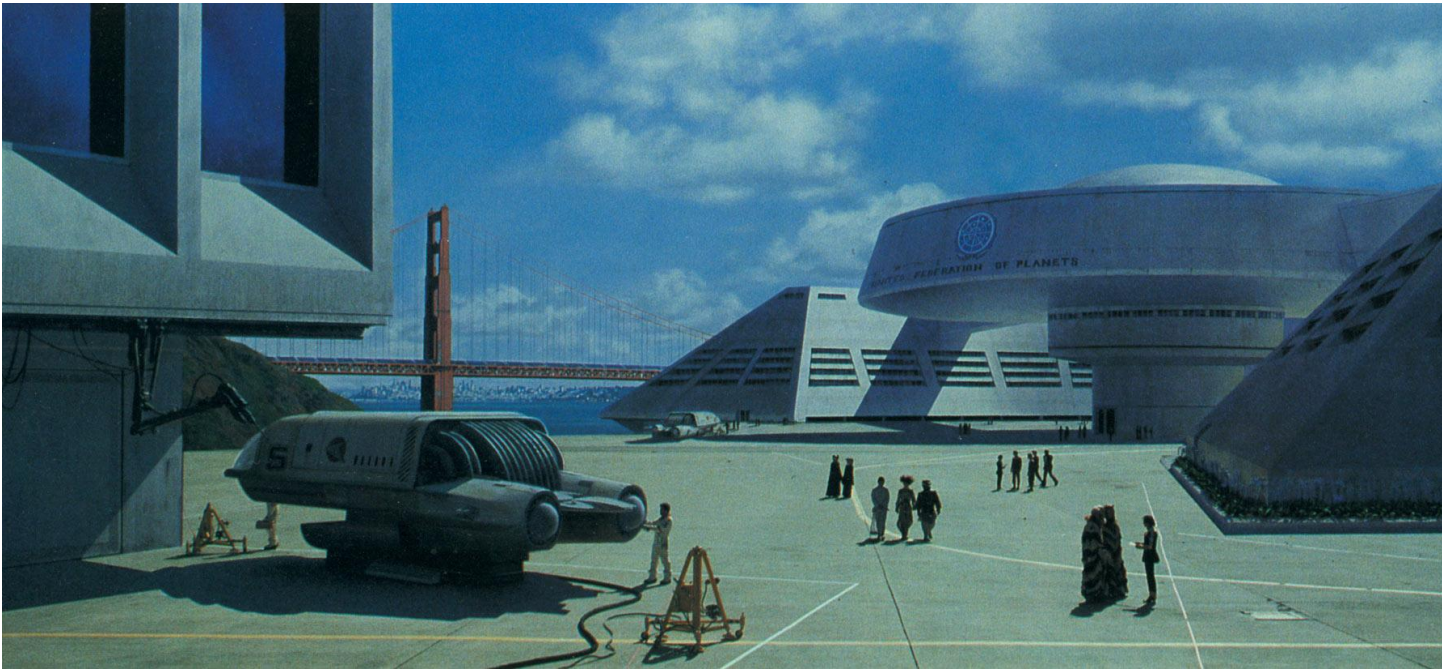
**HUMPBA
TO THE
FUTURE**

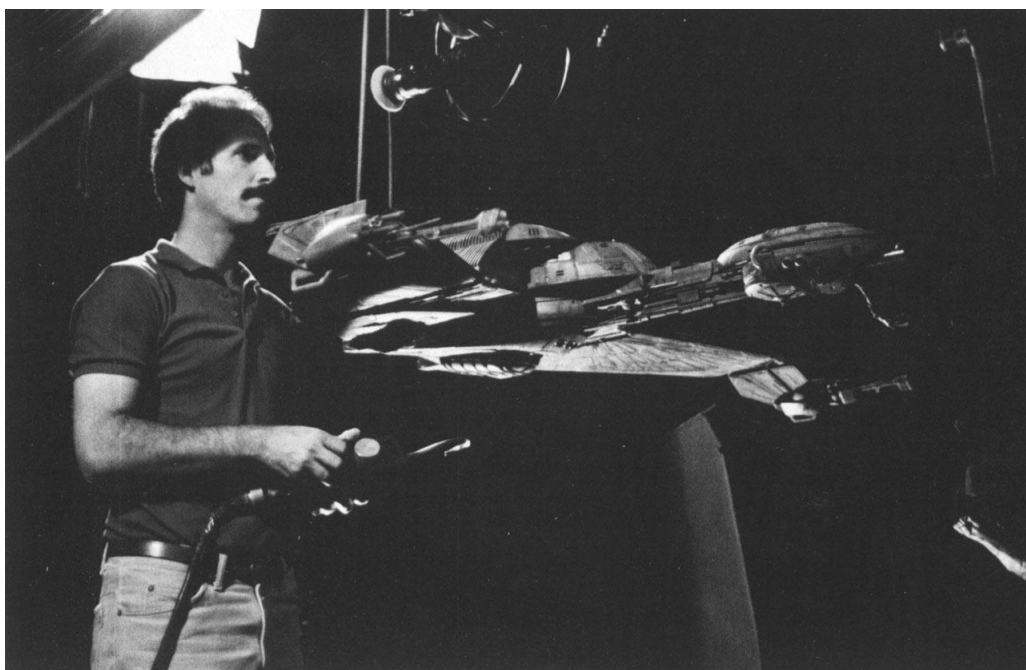
the shot had a pan in it," matte photography supervisor Craig Barron asserted, "because it added so much to it. But it also created technical problems that made the shot more difficult. We worked in some bluescreen material that wasn't really bright enough, for instance. But it's a good direction to go in, I think, putting more movement into these shots instead of always having a static matte shot. Cutting from a shot where there is a lot of movement going on to a static matte shot is too jarring, so in the shots we're doing now we try to add movement whenever possible."

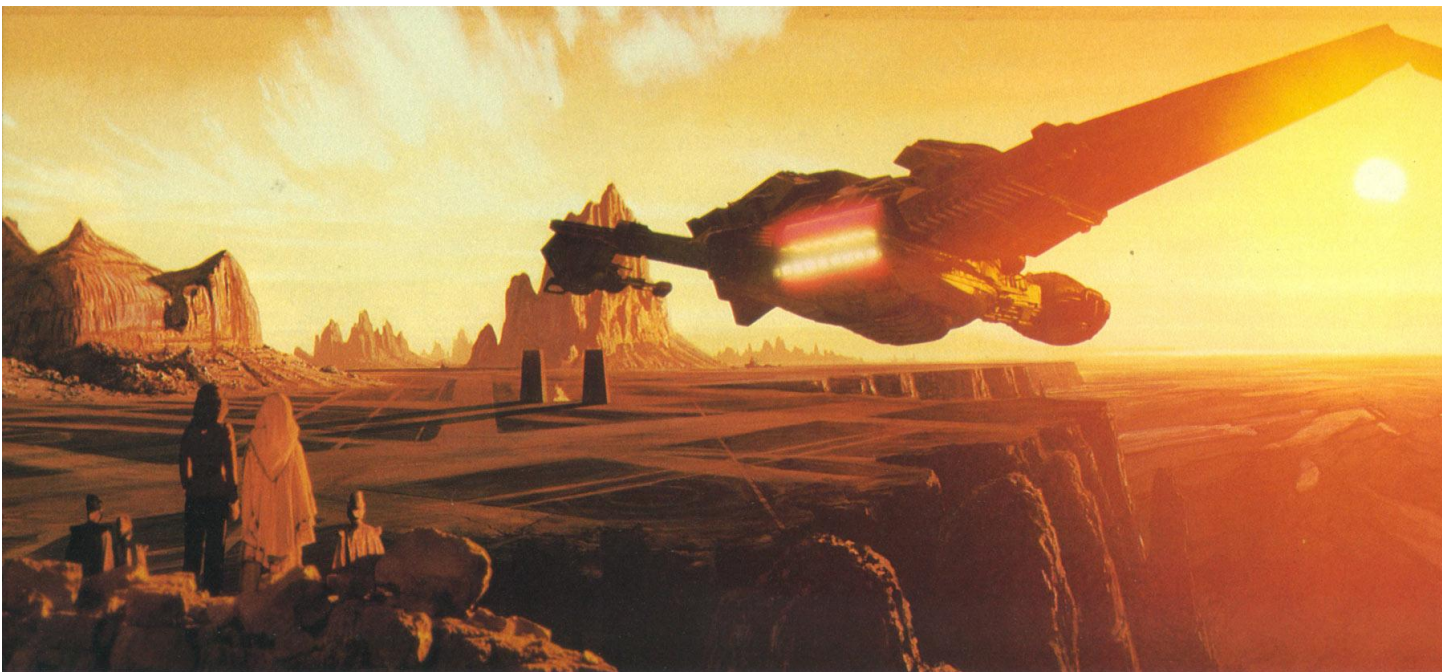
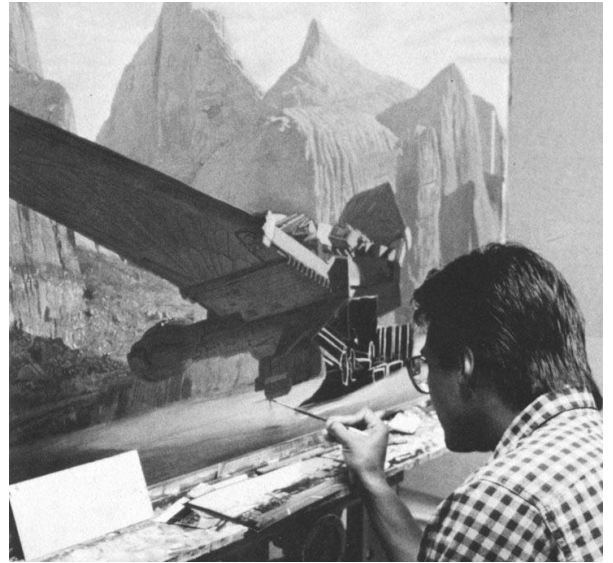
Several approaches were considered with regard to adding the pan. "One way would have been to pan off the foreground characters during the live-action," Barron explained. "Had we done that, though, it would also have been necessary to pan off the painting, pan off the foreground rocks, pan off the sun, pan off the Bird of Prey and pan off a fire element. Rather than try to match all those elements up and make sure that the pan rates were correct for each individual one, it was decided to shoot all the elements static and add the pan with a motion control camera." Matte cameraman Wade Childress was responsible for incorporating the all-important pan movement. "We determined the size of the painting by figuring out how far we could pan," Childress explained, "and since we used the full pan capability of the Automatte camera, we ended up with a very long painting — about four by twelve feet on canvas. The fire element was rear-projected into the painting between a couple of monoliths that are standing out on the plain. And as the camera pans across the painting, a small sun is revealed in the sky. To get the proper flare, we used a bare bulb for the sun and a small plano convex lens to focus the light. We focused the filaments of the bulb right onto the camera lens to get a real nice flare as the ship approaches the sun. So the camera was on one plane, the painting was replaced with the plano convex lens and the light was behind that. Parallax problems developed as we continued to pan across with the sun in front of us, so we had to program the lens to compensate for that — it remained focused on the sun as it came into frame."

Eventually, all of these elements were put together in optical. "I'm very proud of the shot," admitted optical supervisor Ralph Gordon. "We had to take live-action bluescreen and a bluescreen ship and a background matte painting — and not only did it have to be shot so that all the elements interlocked with one another during the pan, but we also had to keep horrendous matte lines from popping up as we went back towards the sun. The sun in a shot like that provides a great blank field for mistakes to show up in, so we had to work with that quite a bit. The reflection of the sun in the element that was provided ended up exposing the matte box of the camera so we got a squarish-looking reflection. Vaseline helped us to diffuse the







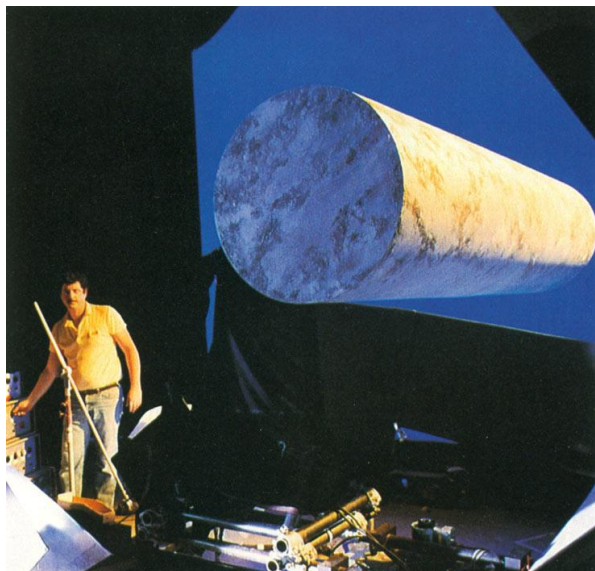




travel passage was one of the most extensive effects sequences in the film — encompassing motion control miniatures, animation, computer generated imagery and major optical work. As scripted, the crew's against-the-odds journey through time could be realized only if they were able to get the Bird of Prey to a speed of warp ten — a feat the ever-pessimistic Scotty considers highly improbable — and then slip past the sun in a daring acceleration-boosting maneuver designed to piggyback off its enormous gravitational pull. Though ILM animators were by now seasoned veterans of the warp drive effect — a signature of the *Star Trek* films — the trailing point-of-view of the Bird of Prey shot made it more difficult than the standard *Enterprise* warp drive to which they were accustomed. "Usually, the *Enterprise* streaks off and is gone so fast that you really don't see anything," said animation supervisor Bruce Walters. "But this shot was much trickier because the warp drive had to keep coming off the Bird of Prey. Not only was the ship going away from us at a slow speed, but we were right behind it and the POV was changing. As the ship was going away from us, we needed the texture in the warp drive to be coming toward us at a fast speed. Another factor that made it tricky was that the tail of the ship was changing a little bit in perspective as it rocked back and forth in the shot. Charlie Mullen created the warp drive, plotting out the ship for the head end of the warp drive and then guessing at where the tail end would be. It was just a matter of trial and error." A more distant shot of the ship as it makes its slingshot maneuver around the sun required another warp drive effect, produced by Jay Riddle of the animation department. "Jay employed slitscan techniques using artwork pieces from various parts of the ship. Taking that artwork and different colored gels and ripple glass, he matched the moves of the ship in the frame and then created streaks off of the different sections."

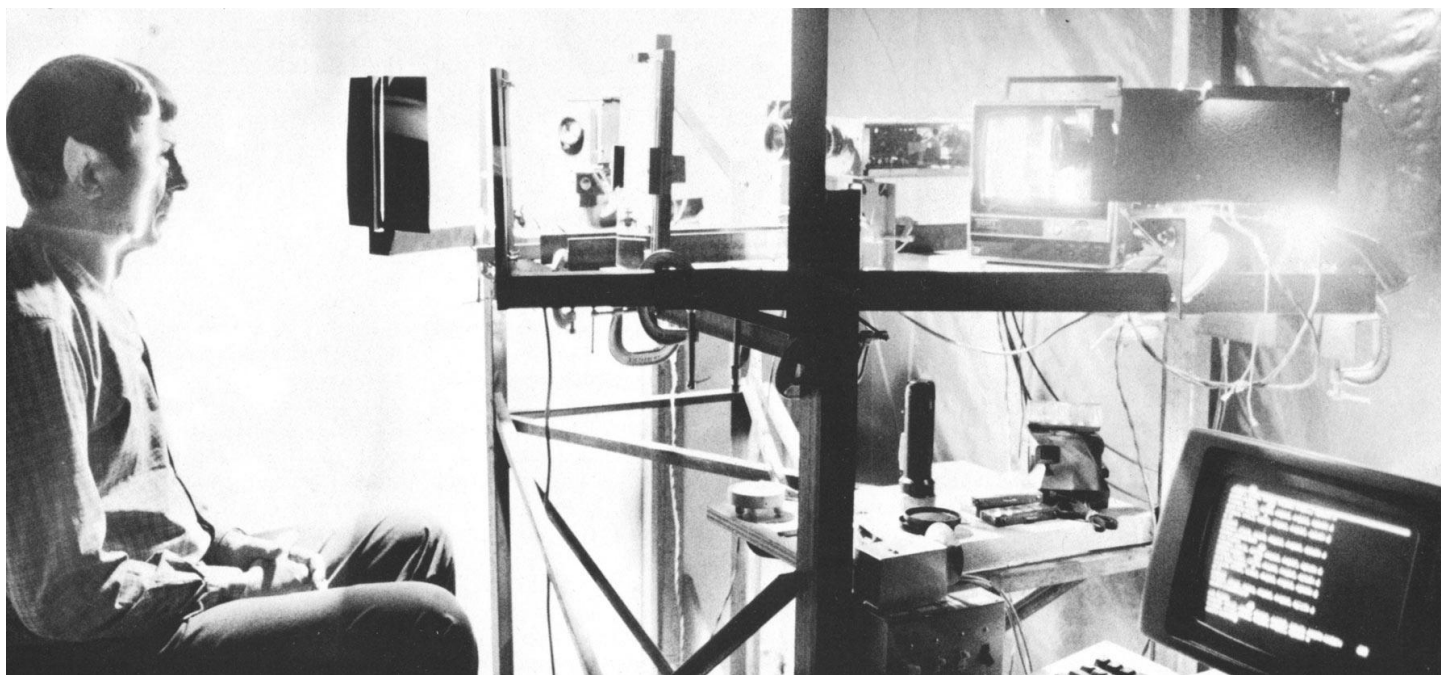
Originally, the animation department was also slated to create the flaming orange sun that fills the frame as the Bird of Prey passes around its backside. However, an already overbooked schedule demanded that the project be delegated elsewhere and the effect was ultimately achieved on stage via a method devised by assistant cameraman Pete Kozachic. "Pete came up with the idea of taking two pieces of flemish glass — which is plexiglass textured like shower doors — and motorizing one of them so that it would turn against the other and give us a moire pattern," Don Dow explained. "The one in back was stationary and the one in front was on a motor setup to make it revolve. The whole thing was set in a circular rack that we

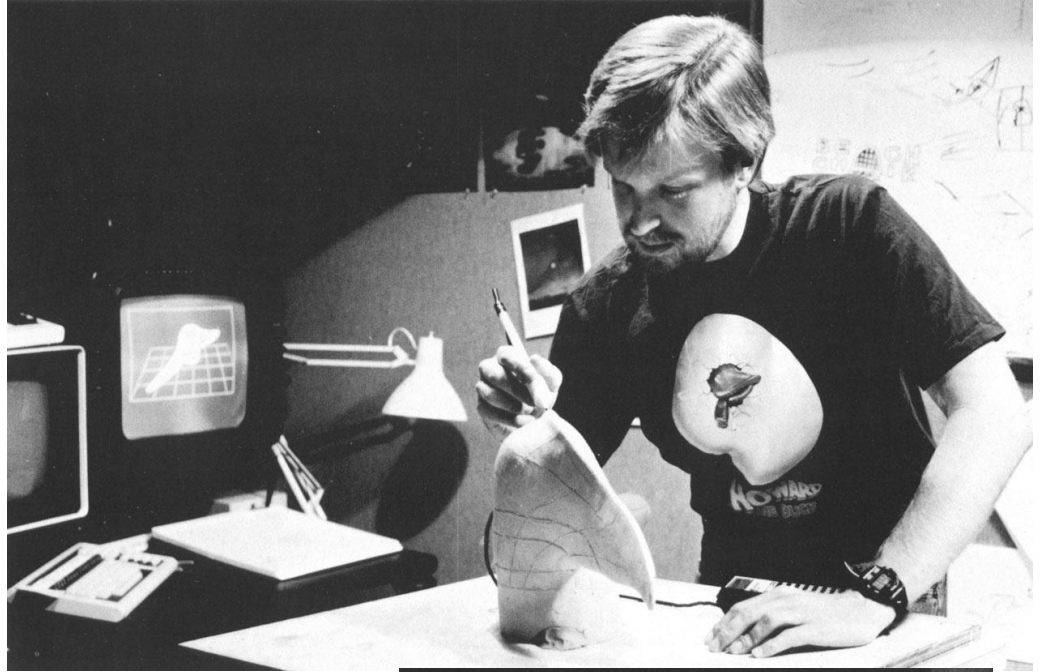
The Bird from Vul shot inv pan acro: matte pa matched model pl action bl and a ba accompa elements voyagers an alien neutraliz defenses worldwic barrage c transmis determin are inten humpbac since dri Only by and trans humpbac can they planetwi Jeff Man pattern t original l The alien

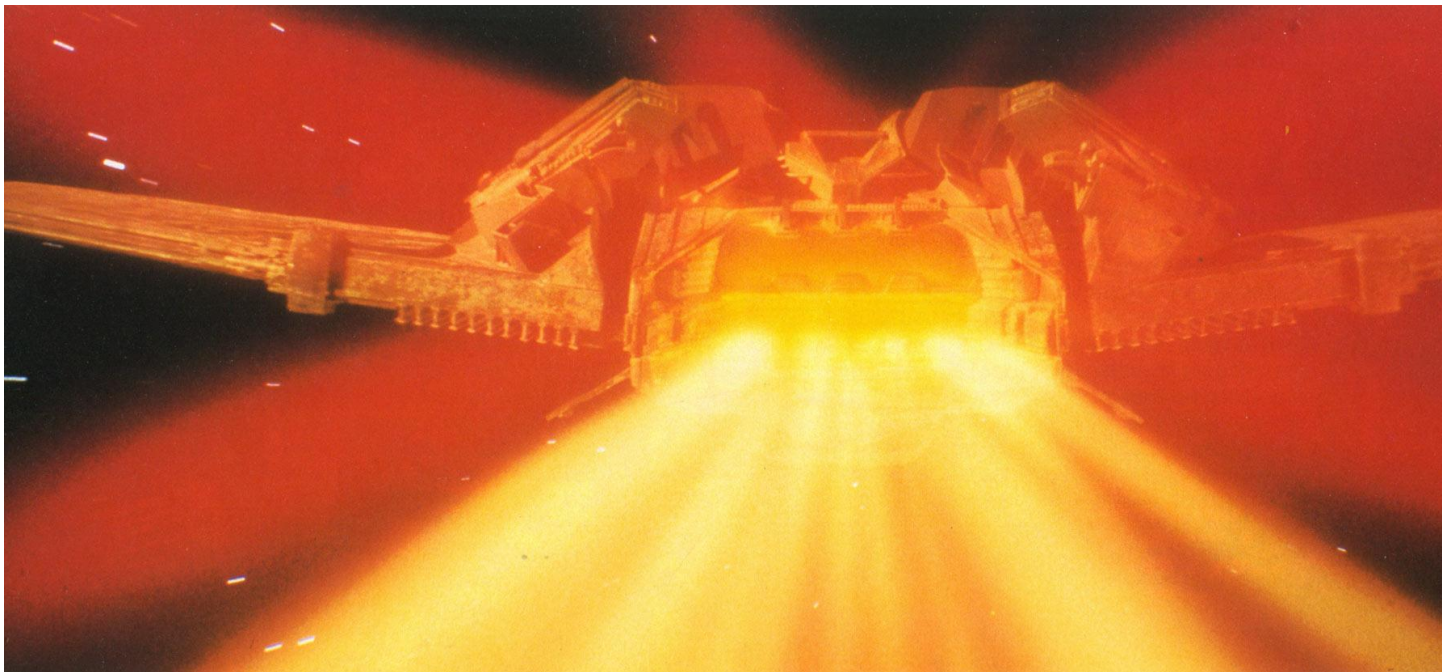


travel passage was one of the most extensive effects sequences in the film — encompassing motion control miniatures, animation, computer generated imagery and major optical work. As scripted, the crew's against-the-odds journey through time could be realized only if they were able to get the Bird of Prey to a speed of warp ten — a feat the ever-pessimistic Scotty considers highly improbable — and then slip past the sun in a daring acceleration-boosting maneuver designed to piggyback off its enormous gravitational pull. Though ILM animators were by now seasoned veterans of the warp drive effect — a signature of the *Star Trek* films — the trailing point-of-view of the Bird of Prey shot made it more difficult than the standard *Enterprise* warp drive to which they were accustomed. "Usually, the *Enterprise* streaks off and is gone so fast that you really don't see anything," said animation supervisor Bruce Walters. "But this shot was much trickier because the warp drive had to keep coming off the Bird of Prey. Not only was the ship going away from us at a slow speed, but we were right behind it and the POV was changing. As the ship was going away from us, we needed the texture in the warp drive to be coming toward us at a fast speed. Another factor that made it tricky was that the tail of the ship was changing a little bit in perspective as it rocked back and forth in the shot. Charlie Mullen created the

*The Bird
from Vul
shot inv
pan acro
matte pa
matched
model pl
action bl
and a ba*





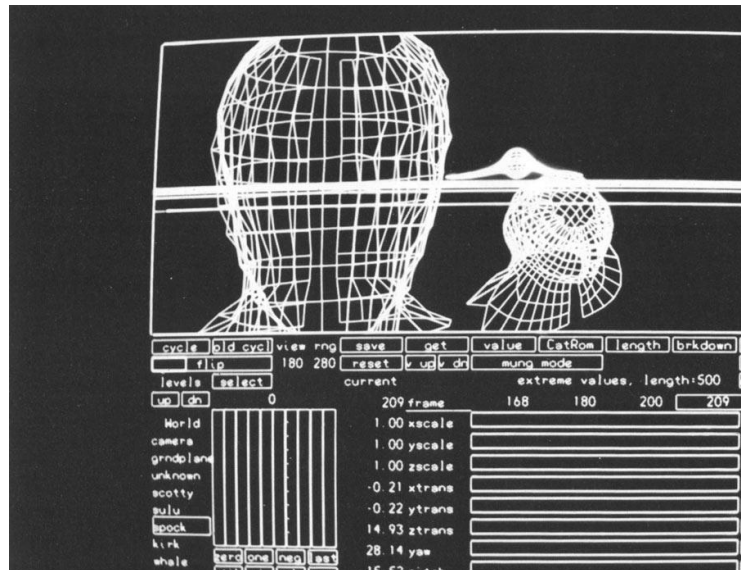
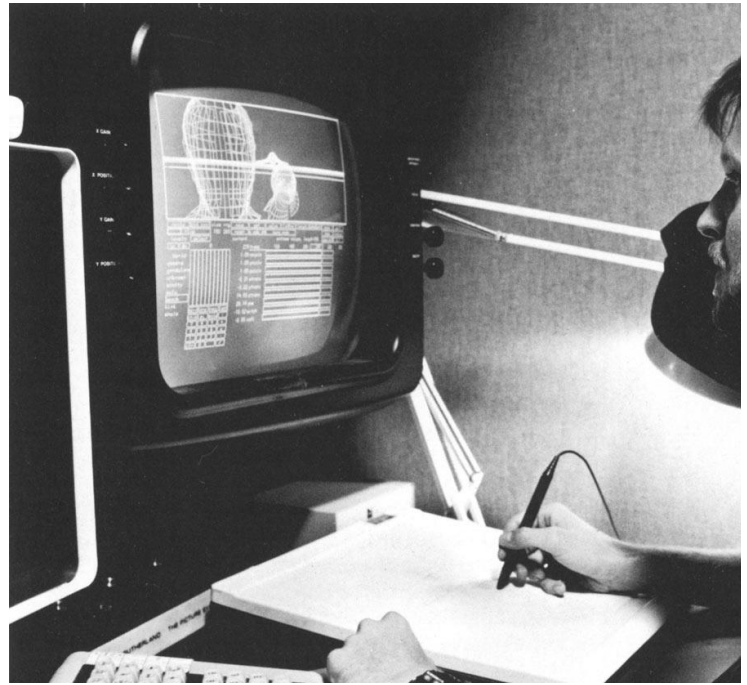


recognized authority on robotic engineering. "Obviously, the whales were central to the story," said Conti, "and the script called for very specific moves and angles and lighting conditions that made some of the more traditional options unacceptable. For instance, they initially looked at using real whale footage that had already been shot; but it would have been difficult to match that footage to the specific moves called for in the script. Also, there isn't much whale footage available on 35mm. So that easy option was thrown out and ILM inherited the problem of the whales. Their first reaction was to shoot a miniature against bluescreen and then comp it into some water plates. But there again, it would've been hard to get any subtlety of movement and the right kind of light interaction. It could be done, but it would be a very lengthy process. Another alternative was to shoot full-size mechanical whales on tracks — which was ultimately done for shots of the whales breaking the surface of the water — but that approach limits you to very specific angles and movements and just didn't seem flexible enough for the underwater sequences."

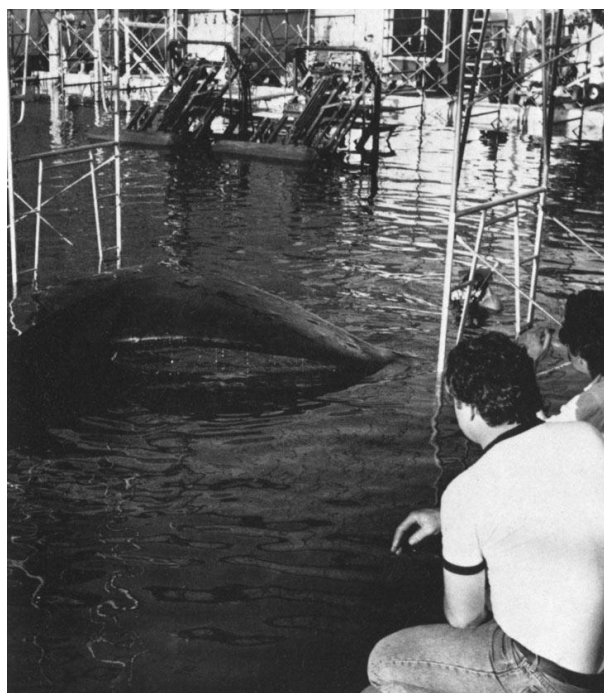
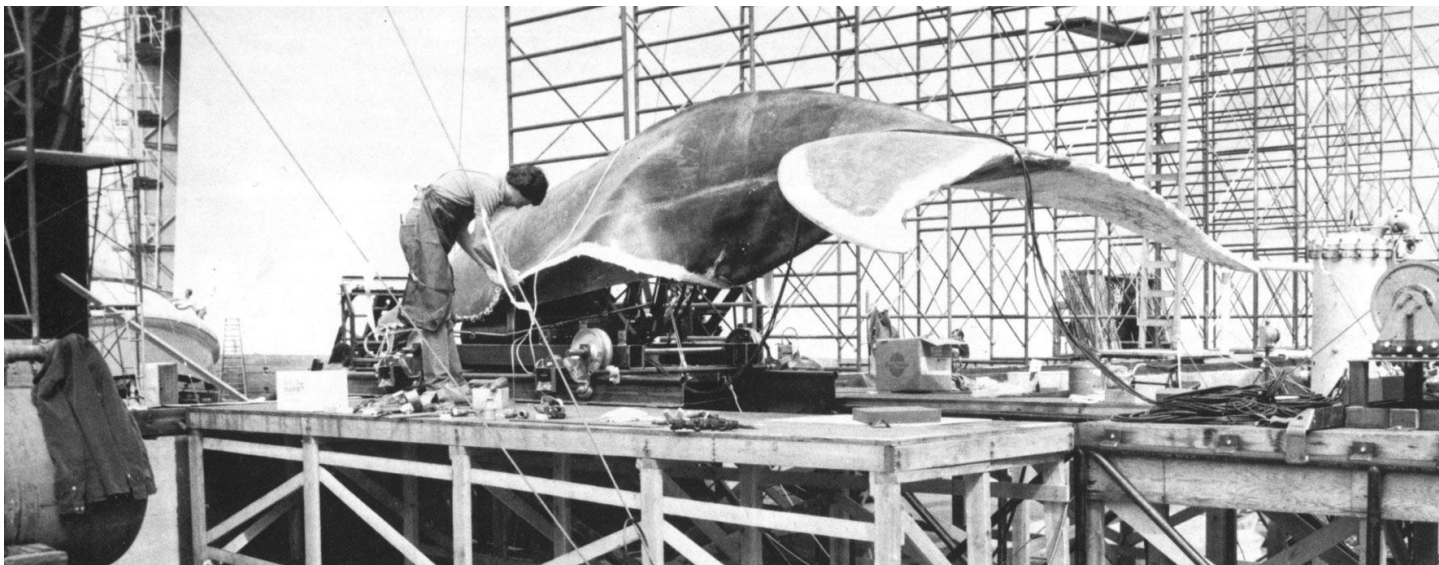
Noting that these various approaches were unworkable for one reason or another, Rodis argued eloquently for an idea that had never before been tried — creating a totally self-contained, free-swimming miniature whale. Having collaborated with Conti before, Rodis knew that his experience in engineering design qualified him to supervise the construction and design of such a miniature, even in light of his inexperience in film. "In some ways," Conti commented, "my lack of film experience was an advantage on this project, because I had absolutely no preconceptions as to how it should be done. I knew it would be quite a challenge, though, because it is more difficult to replicate a real mammal than it is to do a fictitious creature. An audience knows, very specifically, how a real mammal moves."

Conti started by looking at all the whale footage he could find, trying to pinpoint how the animals moved and what parts of their movement were extraneous. "I found that the movement could be simplified tremendously by keeping the front half of the whale rigid and having all the motion in the tail and in the pectoral fins. Those were the most important areas and so we concentrated on them. We put together a thirty-inch prototype very quickly to show to Paramount. It had the tail motion and was free-swimming, but it still had an umbilical cord coming out of it for power. We threw that together and filmed it and showed the footage to Paramount, and they *loved* it. It really knocked them out. They started nitpicking about barnacles and the paint job and so forth, but it was obvious that we were on the right track. At that point, they were able to relax a little bit and we could proceed with the final design."

Having secured Paramount's enthusiastic support for their concept, ILM brought in Pieter Folkens of the Oceanic Society







us. Richard Miller did the actual sculpting, with Pieter's close supervision to insure accuracy." While there was little room for originality in the *look* of the whale — that having been decided through millions of years of evolution — there were still many decisions to be made regarding its technical aspects. "We decided on a four-foot whale just because we wanted to keep it as small as possible and still have room to fit in all the servos and radio gear. Four feet seemed like a good size, everything considered. We spent a couple of months doing research on the tail thickness. That was a very important consideration because if the tail was too thin, it would buckle when it bent. On the other hand, if it was too thick the electrical servos couldn't bend it. So there was a lot of trial and error involved in coming up with the right thickness, and it was kind of tedious — it took us four to six weeks just to home in on that."

From Miller's sculpture, Sean Casey — assisted by Tony Hudson — produced a three-piece fiberglass mold that defined the exterior form of the whale. A fiberglass shell for the front half of the whale — constructed by Rick Anderson — served as a housing for the electrical servos needed to power it. Realizing full well the difficulties involved in running electrical equipment underwater — as confirmed by the infamous 'Bruce' of *Jaws* fame — Conti and his crew turned their attention to devising a means of sealing the electronics to keep them dry and functioning. "We decided it was easier to seal each independent electrical servo rather than try to seal the entire whale. At twelve feet down, one little leak will kill you. So we decided to concentrate on what we wanted to keep dry and just let everything else get flooded." After trying several different silicones to seal the motors, Conti finally settled on a polyurethane marine sealant commonly used for boat decking. Fortunately, only a single dry box was necessary to house all the batteries and the radio receiver.

In addition to the servos that actually powered the whale's thrust through the water, five more servos were mounted in the front to actuate the movement of the pectoral fins. "Each fin had to move independently up and down, fore and aft and rotate. It was pretty complex. The tail, however, was quite simple. It was just a universal joint pivot controlled by two electrical servos. It was a real simple hinge that moved up and down and side to side, and all the bending and arc-of-the-tail movement was achieved by the way the skin was shaped."

Once the mechanics were placed inside, the inner fiberglass structure was covered over with simulated whale skin. "The skin was made from a polyurethane manufactured by Smooth-

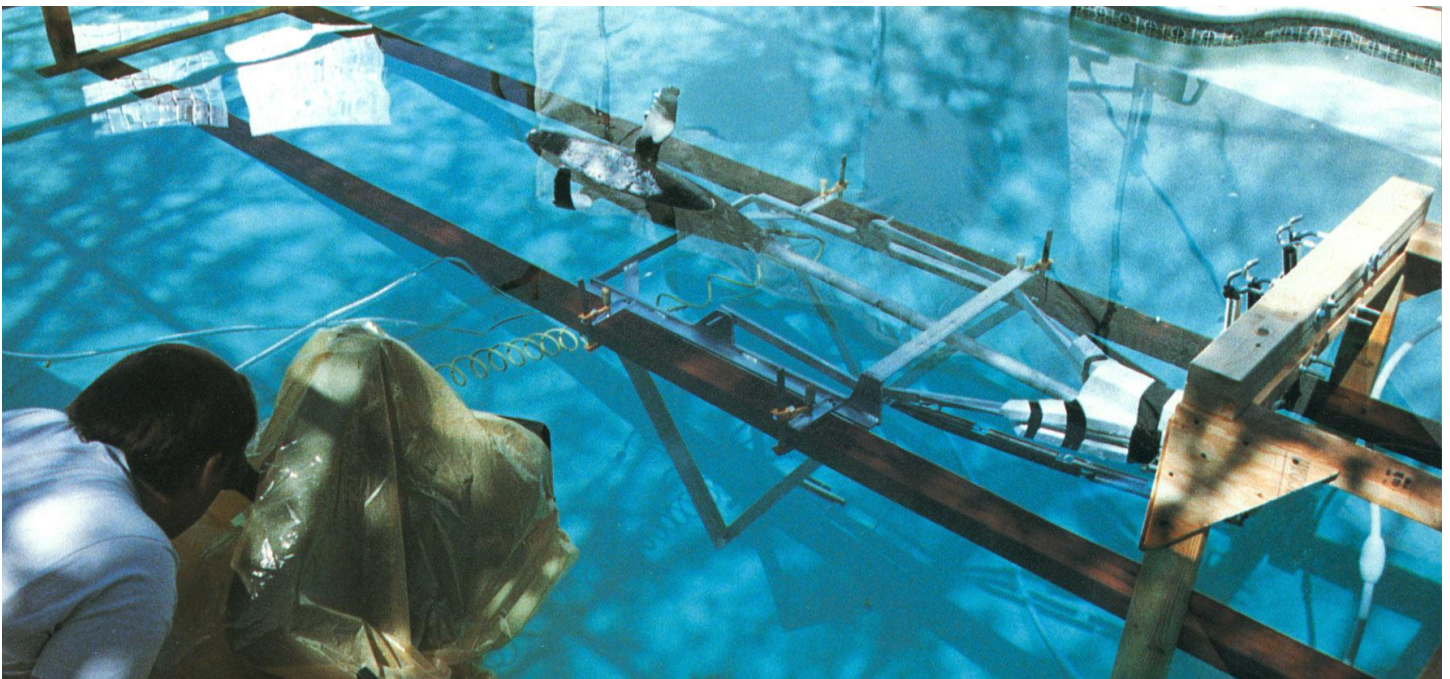
*Success
content
Kirk an
way to
Institu
two hu
being r
Surface
were a
full-sca
section
the din
effects
Lantier
and wh
Robert
the fib
into its
as-yet-
Paramc
uses bi
the pol
to its n
mount
During
session
photog
technic*



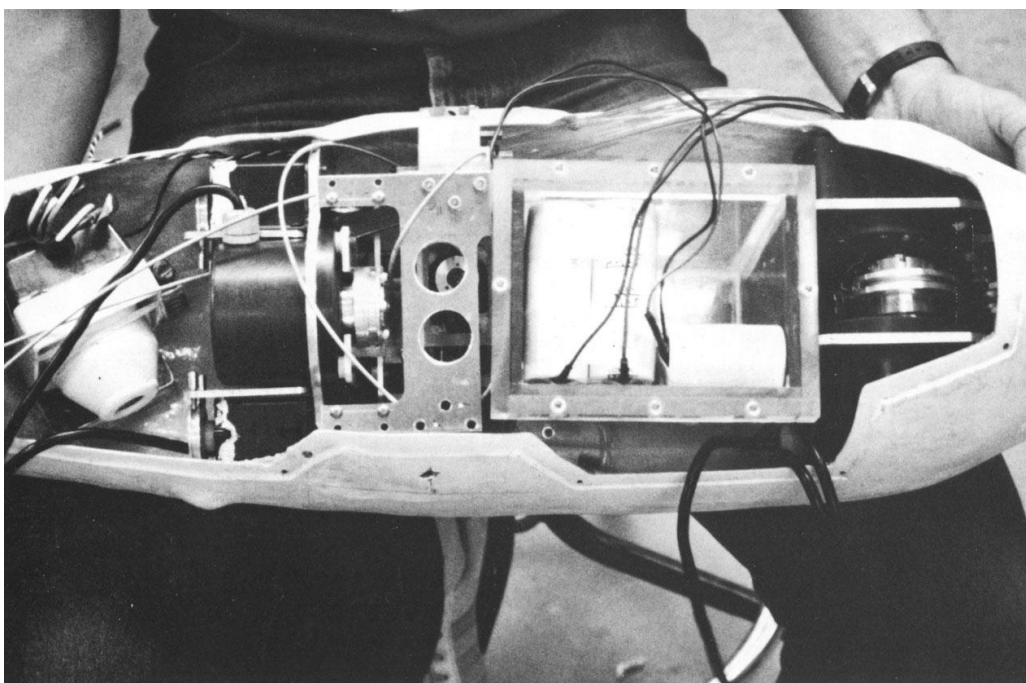
us. Richard Miller did the actual sculpting, with Pieter's close supervision to insure accuracy." While there was little room for originality in the *look* of the whale — that having been decided through millions of years of evolution — there were still many decisions to be made regarding its technical aspects. "We decided on a four-foot whale just because we wanted to keep it as small as possible and still have room to fit in all the servos and radio gear. Four feet seemed like a good size, everything considered. We spent a couple of months doing research on the tail thickness. That was a very important consideration because if the tail was too thin, it would buckle when it bent. On the other hand, if it was too thick the electrical servos couldn't bend it. So there was a lot of trial and error involved in coming up with the right thickness, and it was kind of tedious — it took us four to six weeks just to home in on that."

From Miller's sculpture, Sean Casey — assisted by Tony Hudson — produced a three-piece fiberglass mold that defined the exterior form of the whale. A fiberglass shell for the front half of the whale — constructed by Rick Anderson — served as a housing for the electrical servos needed to power it. Realizing full well the difficulties involved in running electrical equipment underwater — as confirmed by the infamous 'Bruce' of *Jaws* fame — Conti and his crew turned their attention to de-

*Success
conten
Kirk an
way to
Institu
two hu*







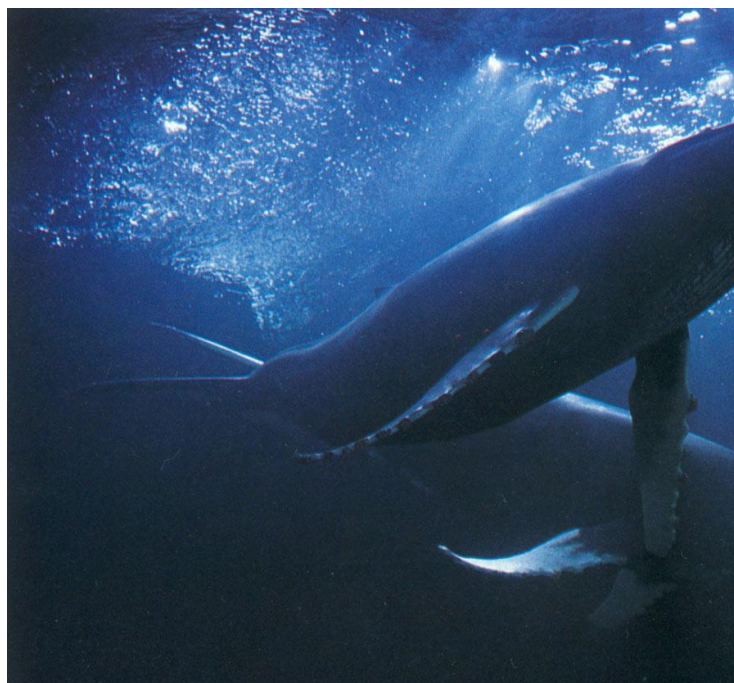


could follow." The optical department also had its share of difficulty with the shot. "The problem was that the live-action plate had a minute but continuous pan in it," Ralph Gordon recalled. "It didn't lock off as they usually do in a transporter shot. As a result, we had to isolate Spock, put the beam on him, fade out that side of the plate and then dissolve to an empty plate there — while still maintaining the truck driving away on the other side. So the challenge was to find an area where we could do a split-screen without this big gaping line coming in to show. Animation wound up hiding the line in the shadow of the trees."

Later in the film, Scotty — and Walters — would be called upon to transport George and Gracie. "Transporting the whales was particularly difficult because whales are the wrong shape for the vertically-oriented transporter beam. To do it, I wound up creating a whole row of transporter beams just to cover them up. The beams were still vertical, but there were several of them laid side by side. We had to do about thirty passes on them — about fifteen passes for the yellow and orange, and another fifteen passes for a white flare that wasn't used."

Before the whales are safely transported, however, they are pursued by a whaling ship. The invisible Bird of Prey deflects a harpoon intended for the whales and then decloaks in front of the whaler and its crew, hovering menacingly above them. "We had a live-action plate of the whaling ship," Don Dow said, "and we were just going to matte in the Bird of Prey behind it. Unfortunately, the ship had very fine radio antennas on top of it that crossed over the area where we wanted to put the Bird of Prey. And since it hadn't been shot bluescreen, it would have been very difficult to get a matte off of it. So we wound up building a model of the whaling boat and photographing it against bluescreen and trying to make it look like the real thing. At least we had footage of the real thing to compare it with. We used live-action water — a plate we had shot out in the bay — and we put the bluescreened whaling ship into that plate and then matted in the Bird of Prey behind it."

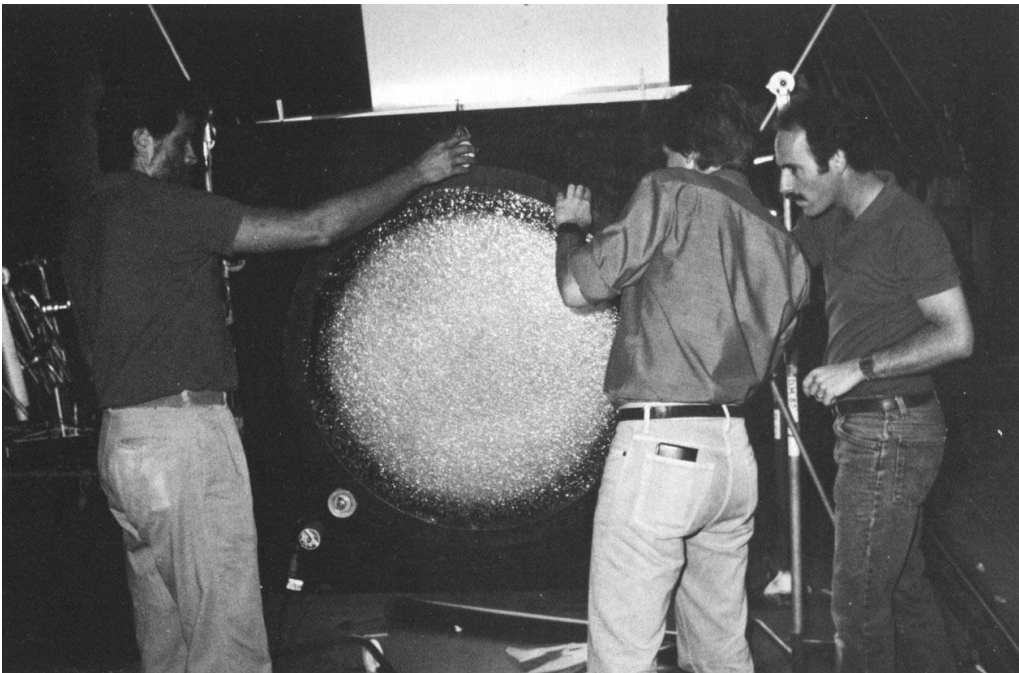
To sweeten the shot, animation added a Bird of Prey shadow on the water and also a jostling water line along the bottom of the ship. "We had the stage crew shoot a black card inserted in some water that had been colored white," Walters explained. "It was shot at high-speed with the water rippling across it, so essentially we had a frame that was black on the top and white at the bottom with a wave going across the middle. We then put that on a pin-block and used it as a matte. I match-moved the edge of the boat with the waves in it and then photographed



could follow." The optical department also had its share of difficulty with the shot. "The problem was that the live-action plate had a minute but continuous pan in it," Ralph Gordon recalled. "It didn't lock off as they usually do in a transporter shot. As a result, we had to isolate Spock, put the beam on him, fade out that side of the plate and then dissolve to an empty plate there — while still maintaining the truck driving away on the other side. So the challenge was to find an area where we could do a split-screen without this big gaping line coming in to show. Animation wound up hiding the line in the shadow of the trees."

Later in the film, Scotty — and Walters — would be called upon to transport George and Gracie. "Transporting the whales was particularly difficult because whales are the wrong shape for the vertically-oriented transporter beam. To do it, I wound up creating a whole row of transporter beams just to cover them up. The beams were still vertical, but there were several of them laid side by side. We had to do about thirty passes on them — about fifteen passes for the yellow and orange, and another fifteen passes for a white flare that wasn't used."

Before the whales are safely transported, however, they are pursued by a whaling ship. The invisible Bird of Prey deflects a harpoon intended for the whales and then decloaks in front





graphics to include the 'A' in the call sign. That required moving everything around and repositioning the numbers and letters on the dish."

Since the interior design of the *Enterprise* had not had a major renovation since its streamlining and updating for *Star Trek I* more than seven years ago, the filmmakers felt it was time to reassess the *Enterprise* in relation to the many other spaceships that had made their way to the screen in intervening years. "We wanted to get away from the random blinking lights that are always in the same place, always doing the same thing," Michael Lantieri explained. "Jack Collis, Don Peterman, Leonard and I all agreed that the new *Enterprise* should have a very sleek, high-tech look to it. The construction department actually built the set for the inside of the ship, but we built modules filled with components that would light the characters, just as we had done with the Bird of Prey. We all got to work very closely with the art department — and since Jack Collis was busy with so many things, he really let us run with it."

Happily aboard their new old ship, captain and crew prepare to 'see what she can do' — taking off at an impressive warp speed which marks a fitting end to the film. As with the Bird of Prey warp drive effect, the *Enterprise's* streak across the galaxy was an animation project. "The inherent problem in any warp drive effect," Bruce Walters explained, "is that the animation camera doesn't have the zoom capability of a stage camera. Stage cameras can move sixty feet and the animation camera can move only six feet. Since a warp drive shot needs as much perspective as possible, that creates a problem. Even the ships shot on stage — moving from as close to camera to as far away from camera as they could — still didn't have as much zoom as they wanted for this warp drive. And we aren't even able to match *that*. So when we match-move something like that we have to make artwork that actually gets smaller as it moves away from camera to enhance the effect of a zoom. Masks are put onto the peg bars and moved in as the *Enterprise* moves away from the camera, which crops the artwork in and makes it increasingly smaller — and that's what gives it such long perspective. Then, as it's shot away from camera, we replace the actual ship with a transparency of the ship and zoom the transparency away. Then we fade it out as it zooms away so that it just disappears and our artwork takes over."

After only six weeks in release, *Star Trek IV* soared past its predecessors to become the most successful film of the series to date. Even if this were not the case, however, one senses that there is a particular enjoyment that comes from working on a *Star Trek* film. Special effects is an industry filled with young men and women, many of whom no doubt watched the *Star Trek* television series as children. Creating the effects for *Star Trek IV* — the third *Star Trek* assignment for ILM — provided vet

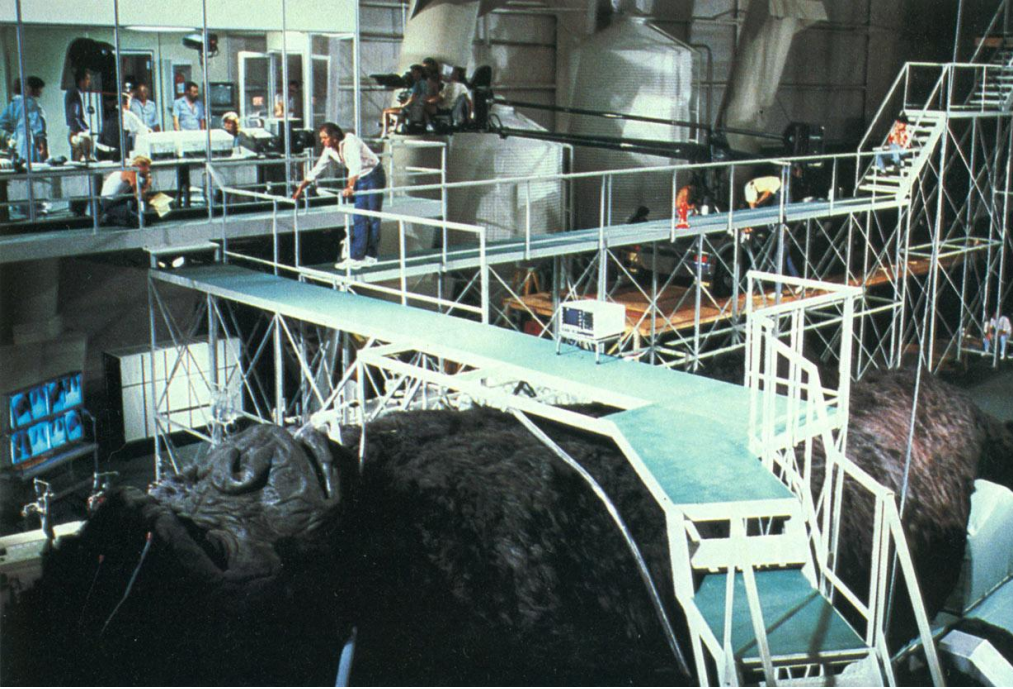


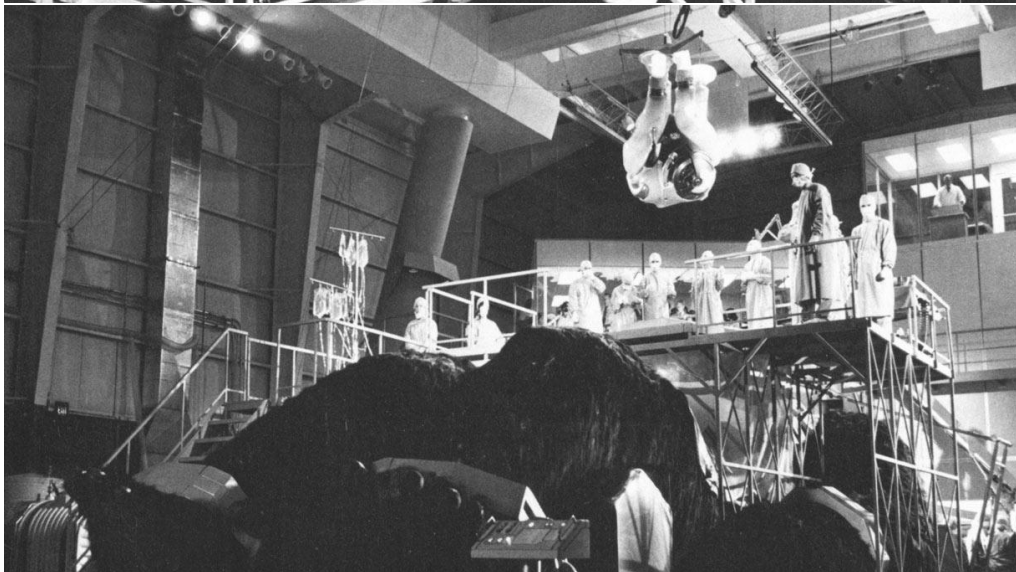
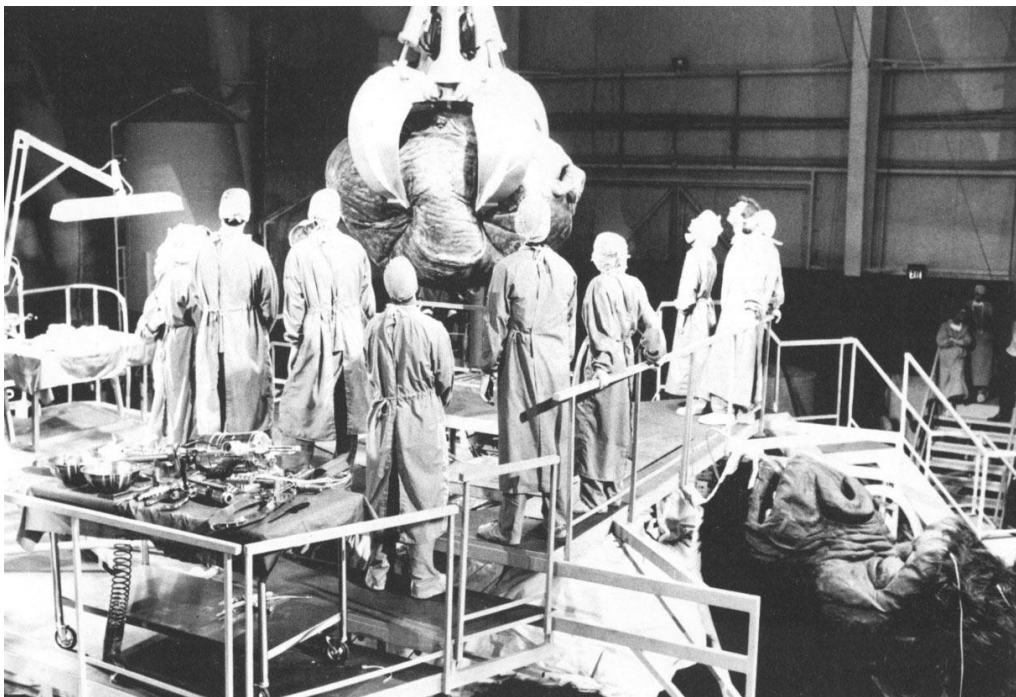


After
the
E



CINEFEX :





In *King Kong Lives*, however, he sometimes also walks in a quadrupedal manner. The arms of the costume were extended for hand grips for the actors to hold onto for balance.

Two separate heads were designed for the male and female Kong costumes — the female differed in body and an auburn-colored mane and expressions operated entirely by cable. They were not like the ones in *Planet of the Apes*, where they used a system of applying the actor's skin and then blending with the prosthetics. The method, the actors had to use their facial expressions through the prosthetics. Of course, they were more human-looking than primate. *Kong Lives*, however, all of the expressions were operated by cable. With the exception of the eyes, which didn't have to move his face a bit, they were directly connected to his skin so he could do eyeblinks, and he wore special scleral lenses. The mask had twelve points of movement — the lips alone. The under-frame was made of metal on top of that were the mechanics and cables for the latex skin and fur. The cables were connected to a control box strapped to the actor's back. A separate set of cables plugged into the box and were carried out of camera to a master operating switch. The cable was usually located about thirty-five feet away and could be extended up to seventy feet, if needed.

Peter Elliott, who had performed in *Greystoke* and *Quest for Fire*, was charged with the challenge of transforming Rambaldi's monkey-like screen presence. "There are certain obvious problems with wearing a suit of this kind," he admitted. "The obvious problems — like the heat and weight loss — aren't necessarily the biggest. The biggest problem is going to have to cope with those in the part is trying to lose the constant suggestion of a suit. Like any animal, we can recognize our own shape. We're long-legged, bipedal creatures; and we're upright more often than a real gorilla — it becomes a matter of finding a motion where you can still maintain the shape of a man in a suit. Strangely enough, the biggest problem is losing our leg length. Our manner of walking — we're the only animals in the world to walk upright, yet still maintain a primate shape is quite a problem."

On the other hand, Elliott and Rambaldi

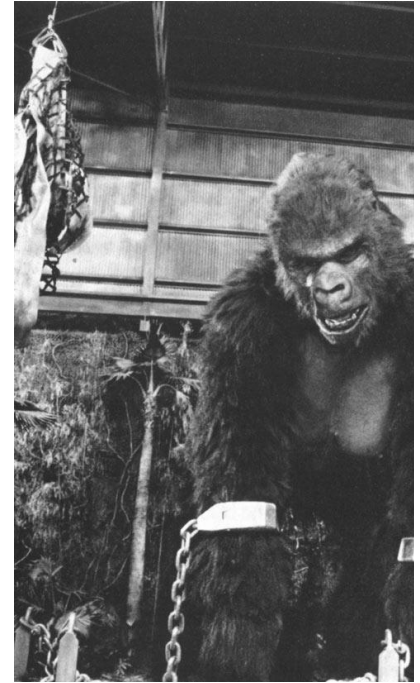
That really made it seem real. It was almost terrifying."

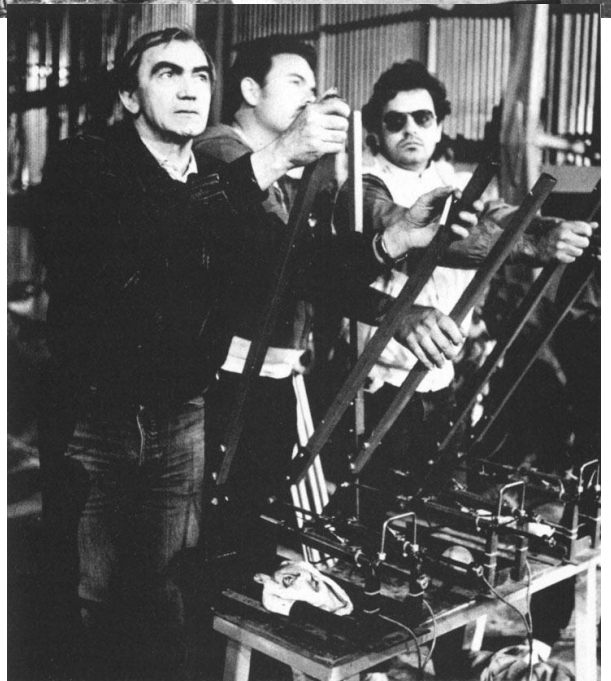
Although used only minimally throughout the movie, the full-sized King Kong did receive considerable screen time during the Atlanta Institute sequences, playing an essential role in the pivotal heart transplant scene. Naturally, the gargantuan patient required an oversized operating arena. "Without a doubt, the largest set we had to build for this film was the intensive care room," continued Murton. "It measured about two hundred feet by one hundred feet and took up an entire soundstage. In fact we actually dressed the stage walls, which were built expressly for this purpose and for the bluescreen process that was used a lot later on. We filled the entire stage with the set — it took about fourteen weeks to get it together. And the equipment we had on it was worth probably a couple million dollars."

Even though it was not grounded completely in scientific fact, the design of the giant-sized artificial heart did honor scientific principle. "You couldn't say the artificial heart was precisely anatomically correct," admitted Murton. "It did have all the right elements — a left ventricle and a right ventricle, and the correct number of parts coming out of the chamber; but that's about where the realism ended. And we didn't base it on any of the actual artificial hearts in existence either. My son, Simon Murton, and I did a lot of preliminary sketches based on what John Guillermin and I thought it should look like, and it evolved from there. We also went to hospitals, got all the books we could find on how a heart actually operates and then made it into the self-supporting, radio-controlled unit that it ostensibly is in the film. It's built like a racing car, really. Fiberglass and steel and a round chassis. Kong's real heart, however, was what a real, diseased ape heart looks like. We did full research on it to make it anatomically correct. It was molded and cast, then constructed primarily out of foam rubber and rubber skins."

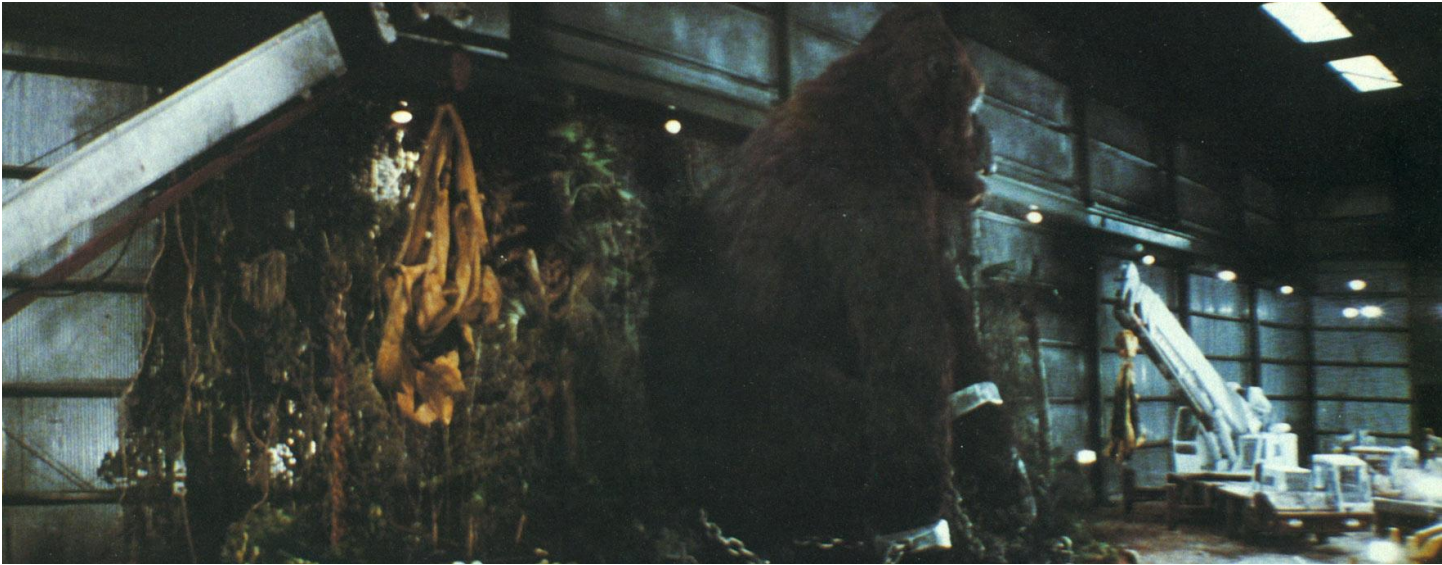
In addition to the full-sized Kong, a separate pair of twelve-foot legs — complete with mechanics for a minimal, natural-looking knee-bend — was also devised for use during the live-action shoot to facilitate authentic interaction with the players. The primary spare appendage used during first unit photography, however, was a full-sized mechanical arm expressly designed for the safe conveyance of actor Brian Kerwin. "The mechanical arm was actually used a lot throughout the film," said Rambaldi. "And it was made quite differently from the one used in the first *King Kong*. Ten years ago, the arm was designed primarily to reach outward — the concept being that the arm had to grab and hold and raise the actors. It was built full-scale, which was very heavy and very complicated. It was great for supporting human weight, but it created other problems. Because it was so heavy, the possibility for speedy action was

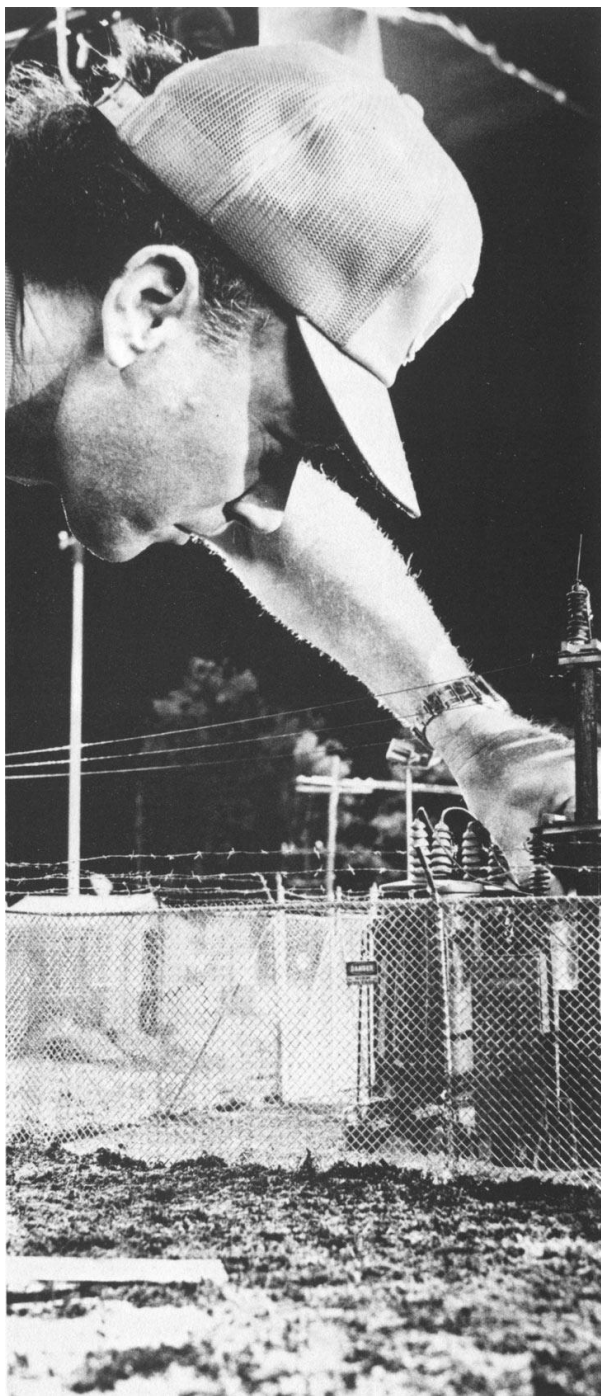
While Kong undergoes surgery, Lady Kong is held in temporary quarters at a nearby warehouse. Actor George Yiasomi — inside one of the Rambaldi suits — was featured in a twelfth-scale replica of the full-size set constructed by the special effects miniature department under supervisor David Jones. / Carlo Rambaldi combs out the yak hair on one of his cable-controlled ape heads. / In the warehouse set, Rambaldi and team members Bill Shepherd and Vittorio Rambaldi man the controls used to impart movement to the large-scale ape. / For warehouse scenes with the live-action performers, only the full-size arms and legs were employed. / Establishing shots — featuring both full-scale and miniature elements — were carefully assembled split-





CINEFEX :













overhead windows. He senses Lady Kong's presence — she is being held in a nearby warehouse, yet another mixed-scale set — and escapes from his confines to rescue her. The full moon was rendered in a straightforward and economic manner. "The moon is actually a beach ball," admitted David Jones, "an actual honest-to-God, rubber inflatable beach ball. The moon was a last-minute addition, and no time was available to make the sphere as we normally would. So the art department handed my painter, Rachel Kelly, an ordinary beach ball and she did an excellent job of transforming it into a full moon. It was shot with filters and smoke to render a nice, hazy halo effect which helped with the illusion."

The warehouse miniature that served as Lady Kong's interim quarters was nearly as large as the Atlanta Institute miniature, measuring seventeen feet wide by twenty-seven feet across and eight feet in height. Full-sized primate parts were set up on location in a real warehouse and then intercut with the man-in-a-suit Lady Kong and the mixed-scale set — creating a unique challenge for the model shop. Because the shot was carefully preplanned as a bluescreen/split-screen composite, the miniature set had to be constructed to accommodate the precise camera angle used on the live-action set. This was essential in order for optical supervisor Barry Nolan to successfully marry the miniature set to the full-size set, thereby putting a man-in-a-suit Lady Kong into the actual warehouse. As a further consideration, the vacuformed ceiling and wall sections were designed to 'wild out' so that lights and cameras could be introduced from any angle. The end of the building, through which Kong crashes to rescue his lady, was constructed from sheet lead and wax. To provide a more naturalistic environment for the imprisoned ape, palm trees, bamboo and other jungle plants were brought in during Lady Kong's captivity — all of which were painstakingly duplicated in miniature by sculptor Bill Rog and then produced in quantity by the tree-making crew under supervisor Chris Crump. "Some of the shots inside the warehouse were the best in the film," commented Nolan. "They were also among the simplest and easiest. The camera was set up and staked for the live-action shoot, and the action with the trucks and tanks was carefully plotted so that they didn't enter into the area where we would eventually insert footage of the small-scale Lady Kong. Here again we used the video assist technique which helped the shot go together very easily."

Just outside the warehouse, Kong steps on an electric power substation causing various minor explosions and electrical

Since the support civilian was responsible for marking, which is out of the Presumptive takes the swamp detailed bidding, subsist Cathie (one of the miniatures for the emergent mate. A band of a rocks up to the drunker with fire bursts, mount scene t



overhead windows. He senses Lady Kong's presence — she is being held in a nearby warehouse, yet another mixed-scale set — and escapes from his confines to rescue her. The full moon was rendered in a straightforward and economic manner. "The moon is actually a beach ball," admitted David Jones, "an actual honest-to-God, rubber inflatable beach ball. The moon was a last-minute addition, and no time was available to make the sphere as we normally would. So the art department handed my painter, Rachel Kelly, an ordinary beach ball and she did an excellent job of transforming it into a full moon. It was shot with filters and smoke to render a nice, hazy halo effect which helped with the illusion."

The warehouse miniature that served as Lady Kong's interim quarters was nearly as large as the Atlanta Institute miniature, measuring seventeen feet wide by twenty-seven feet across and eight feet in height. Full-sized primate parts were set up on location in a real warehouse and then intercut with the man-in-a-suit Lady Kong and the mixed-scale set — creating a unique challenge for the model shop. Because the shot was carefully preplanned as a bluescreen/split-screen composite, the miniature set had to be constructed to accommodate the precise camera angle used on the live-action set. This was essential in order for optical supervisor Barry Nolan to successfully marry

Since the support civilian was remarkable, which i

action miniatures shop.

Amy Franklin and Hank Mitchell — the only humans with any apparent empathy for the giant beasts — return to the Army base in a clandestine effort to spring Lady Kong from her silo prison. To their surprise, they discover her pregnant and due to deliver within a short while. Desperate measures by the would-be rescuers set the silo's floor in upward motion and the overhead doors begin to open. The small-scale silo set used in conjunction with George Yiasomi as Lady Kong proved to be one of the more challenging model shop efforts — primarily because the script called for the floor to rise to the top of the shaft. "The set was supposed to move like an elevator," John Wood explained, "but rather than moving the floor up, we kept it static and had the walls move down instead. That meant an enormous chute had to be mounted, which was only six feet in diameter. And to get lighting in there, as well as the camera, was rather a nuisance. It was also very difficult for George because of the close quarters, the hot lights and the North Carolina humidity — not to mention having to perform in the Lady Kong suit."

The rescue attempt is nearly thwarted when a security officer begins to close the doors at the main switch. King Kong suddenly appears, however, and with heroic effort grips the almost-closed concrete doors and breaks them open. "Bill Alford had the especially tricky assignment of making the breakaway silo doors," explained Kelsey. "The art department had a very specific way they wanted the doors to break. We had to have a crack right through the middle and then some subsequent breaking up of chunks of cement afterwards. In order to do that we needed a lot of time, skill and luck. We used a soft annealed wire to simulate the rebar that would have been in genuine cement, and breakaway plaster material for the cement itself. The backside of the breakaway material was carefully scored to dictate exactly where it was supposed to break — and it *will* break where it's been scored about ninety percent of the time. We also fabricated chunks of fiberglass in a certain texture to replicate broken cement."

The opening mechanism was built by Ron MacInnes. "When Kong grabs the doors to prevent them from closing," elaborated Kelsey, "it causes the motors to burn up and the gears to churn and break away with sparks and smoke — a really interesting camera shot right through the mechanism with the wheels turning and then all of a sudden breaking apart. The overall mechanism was made of breakaway material, while the gear

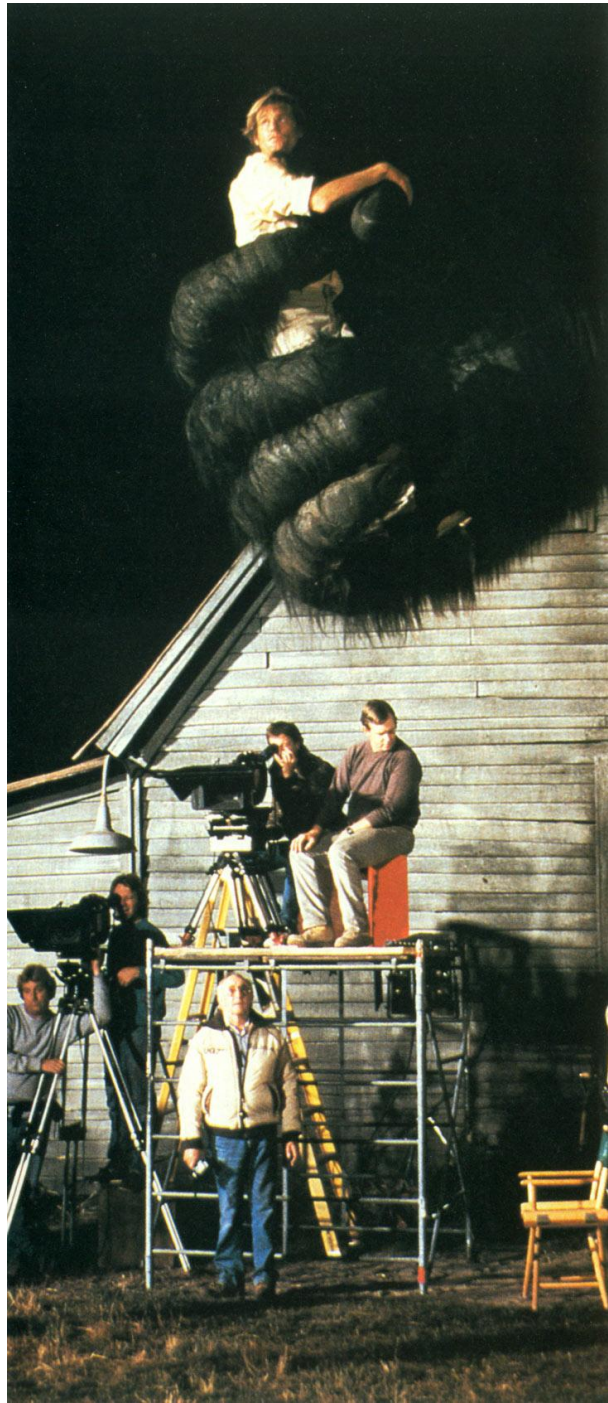


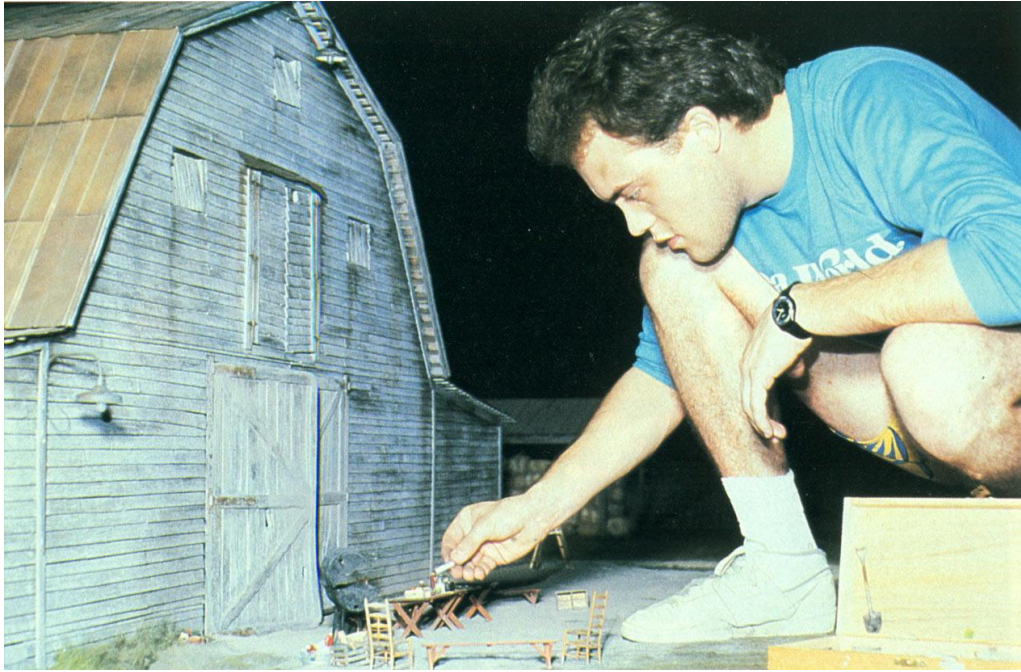
action miniatures shop.

Amy Franklin and Hank Mitchell — the only humans with any apparent empathy for the giant beasts — return to the Army base in a clandestine effort to spring Lady Kong from her silo prison. To their surprise, they discover her pregnant and due to deliver within a short while. Desperate measures by the would-be rescuers set the silo's floor in upward motion and the overhead doors begin to open. The small-scale silo set used in conjunction with George Yiasomi as Lady Kong proved to be one of the more challenging model shop efforts — primarily because the script called for the floor to rise to the top of the shaft. "The set was supposed to move like an elevator," John Wood explained, "but rather than moving the floor up, we kept it static and had the walls move down instead. That meant an enormous chute had to be mounted, which was only six feet in diameter. And to get lighting in there, as well as the camera, was rather a nuisance. It was also very difficult for George because of the close quarters, the hot lights and the North Carolina humidity — not to mention having to perform in the Lady Kong suit."

The rescue attempt is nearly thwarted when a security officer begins to close the doors at the main switch. King Kong suddenly appears, however, and with heroic effort arns the almost-









are pretty sophisticated and they like to pick this stuff apart, so we really try to be accurate."

As Kong lifts Lady Kong to safety, she impulsively grabs Mitch and takes him along to a nearby barn where she is eventually to give birth. Mitch is released to safety as Nevitt and his troops mobilize for action. Lady Kong then falls backwards into the barn, and King Kong does his best to take on the United States Army single-handedly during the film's climactic battle. "We ended up making three miniature barns for the sequence," explained Jones. "They were made in sections — fronts, interiors and so on — so that the structure would break apart in a certain way. Of course, making sure it broke correctly even once was an all-day affair — setting it up, getting it ready, getting the actors in place. The set itself was made by Bernardo Munoz, Bill Rog and Chris Crump. They had to duplicate, in miniature, the deciduous trees which the farmer had by the real barn on location. Seven of them actually had to match the location to a 'T' because of the way we intercut our miniature barn with live-action. The full-sized barn was actually a smaller scale than what Lady Kong could have fit into; so while all the closeups were being shot, we made the miniature one-and-a-half times larger so that George Yiasomi could fit inside. It was a good example of what doing mixed scales entails. We ended up doing three barn-breaks to cover camera lighting angles, as well as some reverse angles. In all, the sequence required more than forty shots."

Three separate cameras were set up to record the event on film. "All of the cameras were shooting at high-speed," continued Jones. "We had shot the first take at 76 frames per second, but that proved to be a bit too slow for the director's taste — although it was more in accordance with how you would normally view something falling. For example, if a board from a real-sized barn were to drop forty-six feet, it would take so many seconds for that board to hit the ground. When you've got a model that measures only forty-six inches, it only takes a fraction of that time for a board to fall. So to make it look real on screen, you have to overcrank the camera. By shooting everything faster than reality, when it's played back at 24 frames per second it appears to take exactly the right amount of time for the board to hit."

Model shop lead man David Sharp was in charge of setting up the sequence. "As Lady Kong fell into the barn, we had a manifold cam with a series of air jets on it operated by a hand crank. The operator watched a monitor and turned the crank in a carefully synchronized manner so that as she started to blast through the barn a couple of the shingles fell off. Then, as she finally hit the ground, to simulate the displacement of air resulting from a forty-ton monkey blowing out the sides, we had jets lining the inside of the barn to blow dust and boards

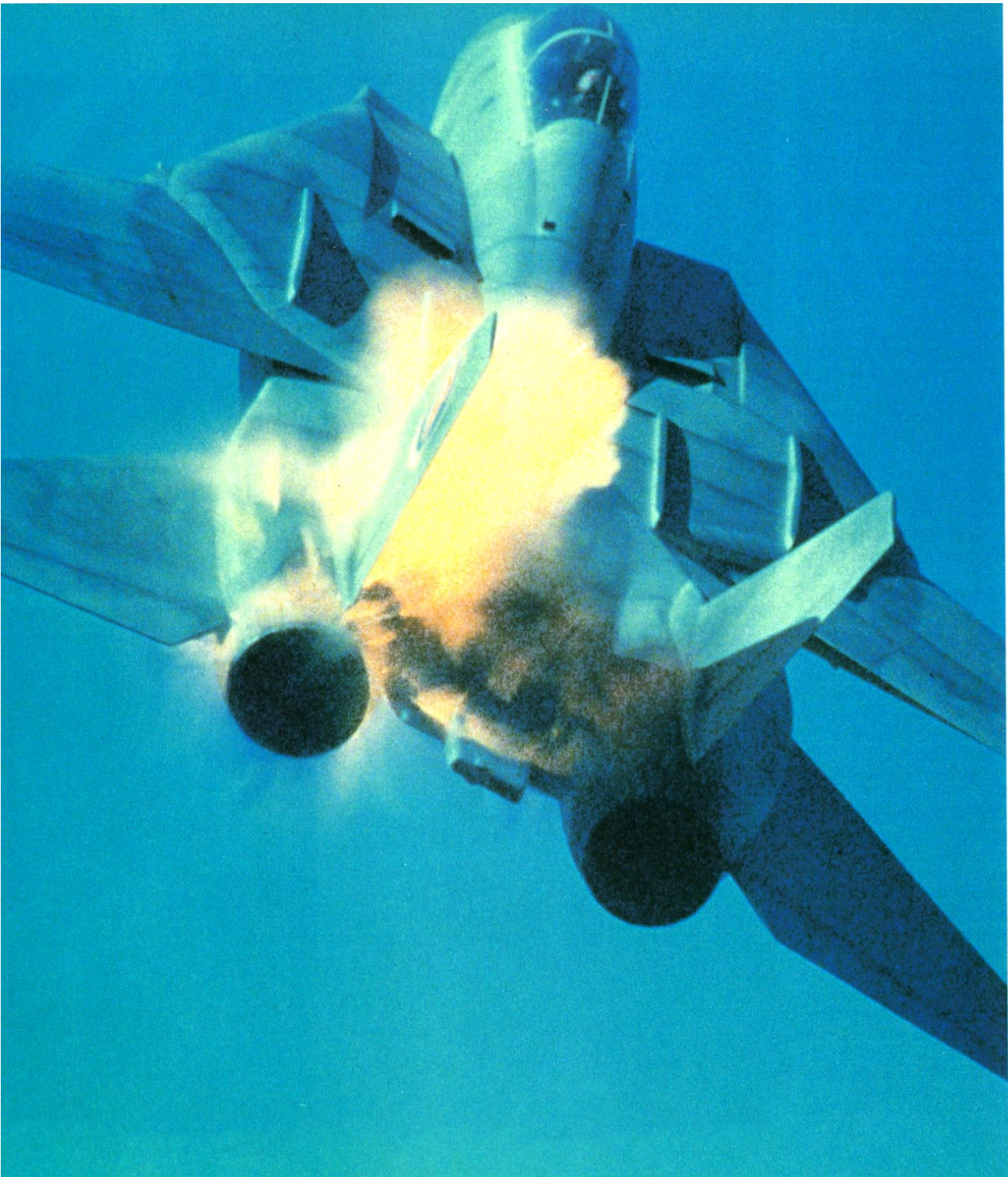
Modelma position. picnic ta final step miniatur featured film's fir and Geoi for the s Kong — i — tumbi Like mos miniatur barnyard construc platform angle sh point of the giant waits be live-action the barn Attempti pregnant writhes i opens up

screen for this one," Nolan explained. "The frontlit blue screen we used before measured about forty by sixty feet, which is considerably smaller than the new one. It took about twenty arcs to light — with one person to man each arc — and then the arcs had to be trimmed and balanced each time you changed the carbons in them, which was about every ten to fifteen minutes. To use it, we also needed a very wide stage to get the arcs out of the light. All of these things are aspects that made the process very time-consuming. With the new screen, however, we could just turn on the lights. We really tried to make it state-of-the-art and incorporate into it everything that we have been learning about how to make blue screens in the past twenty years. The screen itself is a double-density blue screen made by Stewart Film Screen of California. It has about twelve hundred eight-foot fluorescent bulbs behind it, and even has its own air conditioning system to keep it cool and a gantry built into it for maintenance on both sides of the screen. It was completely automated. I had a little switchbox that I carried around with me that I could use to turn the lights on or off in various sections, or even change the intensity of light on the screen from remote. So it was really just a matter of the cameraman lighting the shot in the foreground and not paying any attention to the background. Additionally, because of its size, we were able to get the characters far enough away from it to eliminate blue spills. So a lot of the problems inherent in bluescreen were simply eliminated."

The optical composites were assembled at Van der Veer Photo Effects in Burbank, California. "On a picture of this magnitude," said Nolan, "where there are a lot of little changes and minor corrections and things that need to be done, we try to get the production company to move in with us. We have adequate postproduction facilities — projection, editorial rooms and sound dubbing — and it's so much quicker when you can just walk across the building to the editorial department or the director and check these things out, rather than having to drive from one end of town to another or go from one end of the country to the other."

Though the final tally of visual effects shots in *King Kong Lives* approximated the total number for *King Kong*, the effort was streamlined considerably by the unique composition of the crew. "We were very fortunate that the effects crew was made up of pretty much the same people who worked on the last *King Kong*," commented Nolan, "which is a very rare thing for a sequel. We learned from the first film where all the mistakes were made. And we learned how to improve our techniques. We didn't have to go back and start from scratch and reinvent the wheel. So there was not really much need for experimentation or trial and error or trying to figure out how to do the picture. Since we all knew from previous experience the problems that





U U W W I I U U



article by
Ed Mar

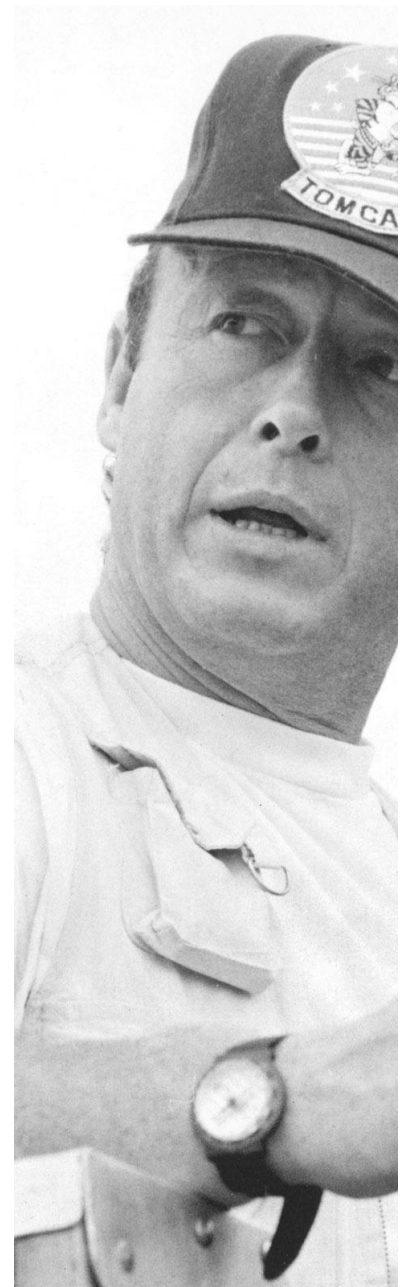
Top Gun director Tony Scott surveys a setup during principal photography at Miramar Naval Air Station north of San Diego. / The film, which follows an elite corps of naval aviators through a highly-competitive training program and then into a real-life combat situation over the Indian Ocean, received extensive cooperation from the U.S. Navy. / Though most of the flight sequences employed actual jet aircraft, some of the scenes involving crashes and explosions had to be achieved with miniatures. To this end, the producers engaged photographic effects supervisor Gary Gutierrez and his USFX facility based in San Francisco. / On location in Oakland, USFX crew

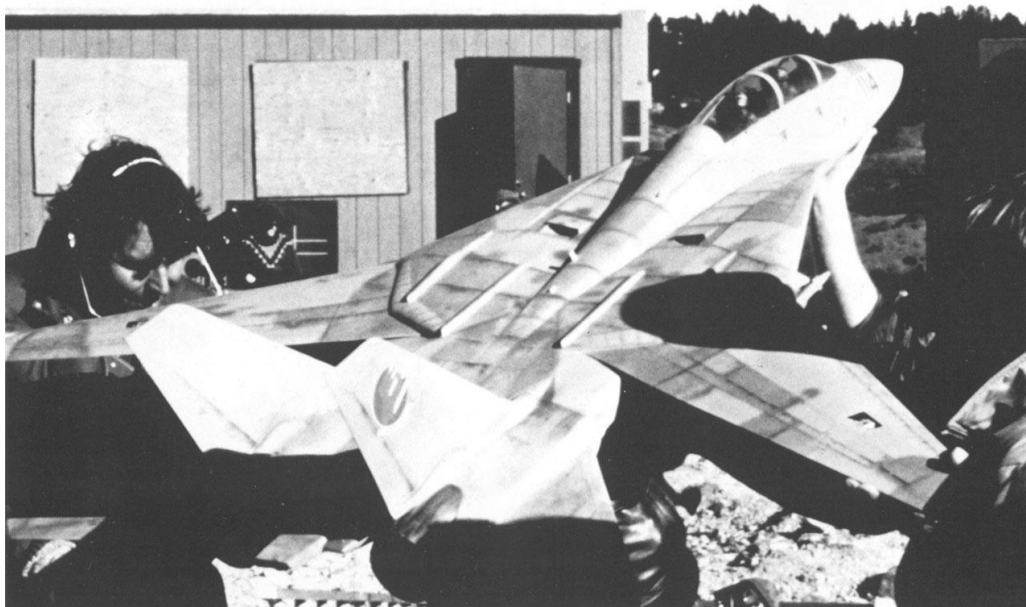
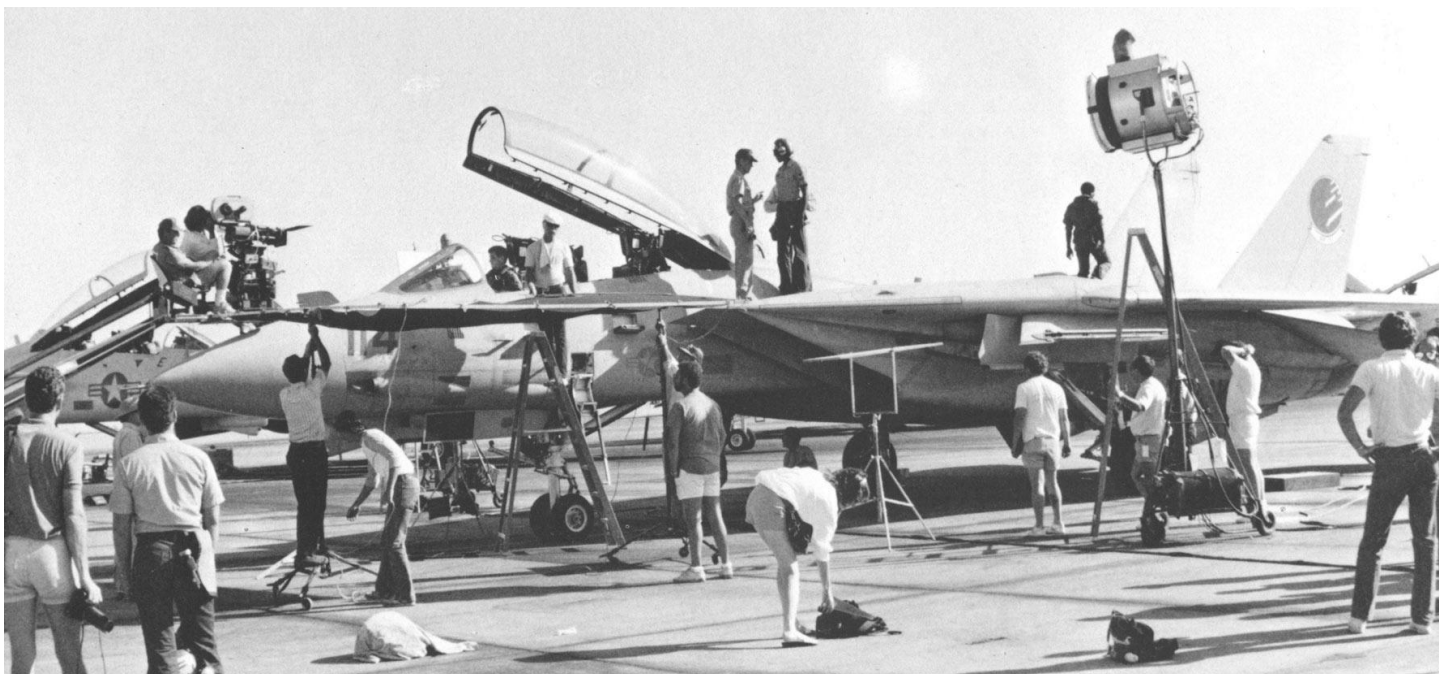
An electronic signal warns Lieutenant Pete Mitchell that his F-14 Tomcat has been targeted by an enemy aircraft. Only a split-second response can save the \$30 million fighter and its two-man crew. With a knowing over-the-shoulder glance toward his radar intercept officer, Mitchell pulls back on the stick sending his Tomcat screaming into the heavens as the foiled pursuit craft and its missiles shoot on past. The maneuver, executed first in training and then later in combat, is one of the signature moves of a highly competent but dangerously unorthodox young aviator — call sign 'Maverick' — played to the hilt by actor Tom Cruise in *Top Gun*.

'Top Gun' is the colloquial designation for the U.S. Navy's ultra-elite Fighter Weapons School, an intensely competitive combat training program established to teach high-tech dog-fighting techniques to the top one percent of all naval aviators. The school was created during the early years of the United States involvement in Vietnam when military authorities became alarmed at the number of aircraft being lost in aerial combat. Though the kill ratio was ostensibly favorable — three enemy planes shot down for every American craft destroyed — it was nonetheless a sharp decline from the markedly more favorable seventeen-to-one ratio of Korea and the fifteen-to-one ratio of World War II. Clearly something had to be done. In response to the loss of American flight crews and equipment, the Navy recommended to the Department of Defense that a specialized fighter training program be created. So in 1969, at the Miramar Naval Air Station north of San Diego, the Navy Fighter Weapons School came into being.

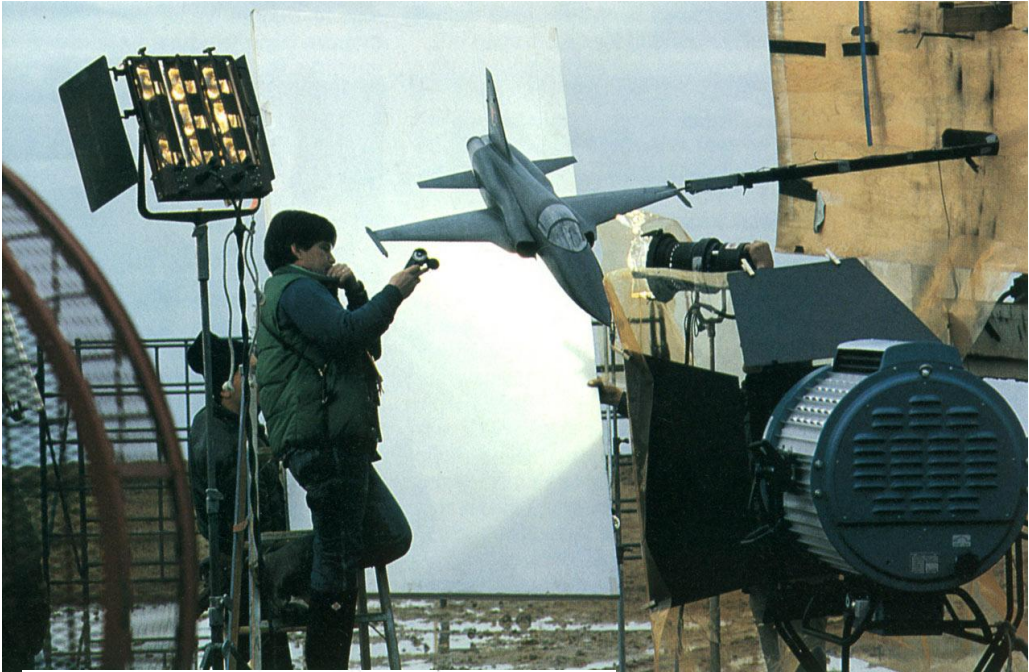
For years the school fulfilled its charter in relative anonymity until film producers Don Simpson and Jerry Bruckheimer discovered an article on the unit in *California* magazine. Simpson and Bruckheimer — whose cinematic Midas touch had been evident in *Flashdance* and *Beverly Hills Cop* — responded strongly to the text and even more so to the accompanying photo images of jetfighter helmets framed against blue skies and gleaming supersonic aircraft engaged in mock combat. To them the association was obvious. A scant two hours' drive from their Hollywood offices *Star Wars* was being acted out on earth. All they needed to do was work the elements into a motion picture.

Since authenticity and technical realism would be crucial to any such endeavor, Simpson and Bruckheimer began by pitching their as yet undeveloped film to Navy officials at the Pentagon. Happily the Navy was more than receptive to the idea — offering near carte blanche access to facilities, aircraft and personnel for an agreed-upon fee. With the Navy's cooperation thus secured, screenwriters Jim Cash and Jack Epps, Jr. were put to work on a script and British-born filmmaker Tony Scott was engaged to direct. Scott, with only a single feature to his credit — the elegantly mounted but financially unrewarded modern-

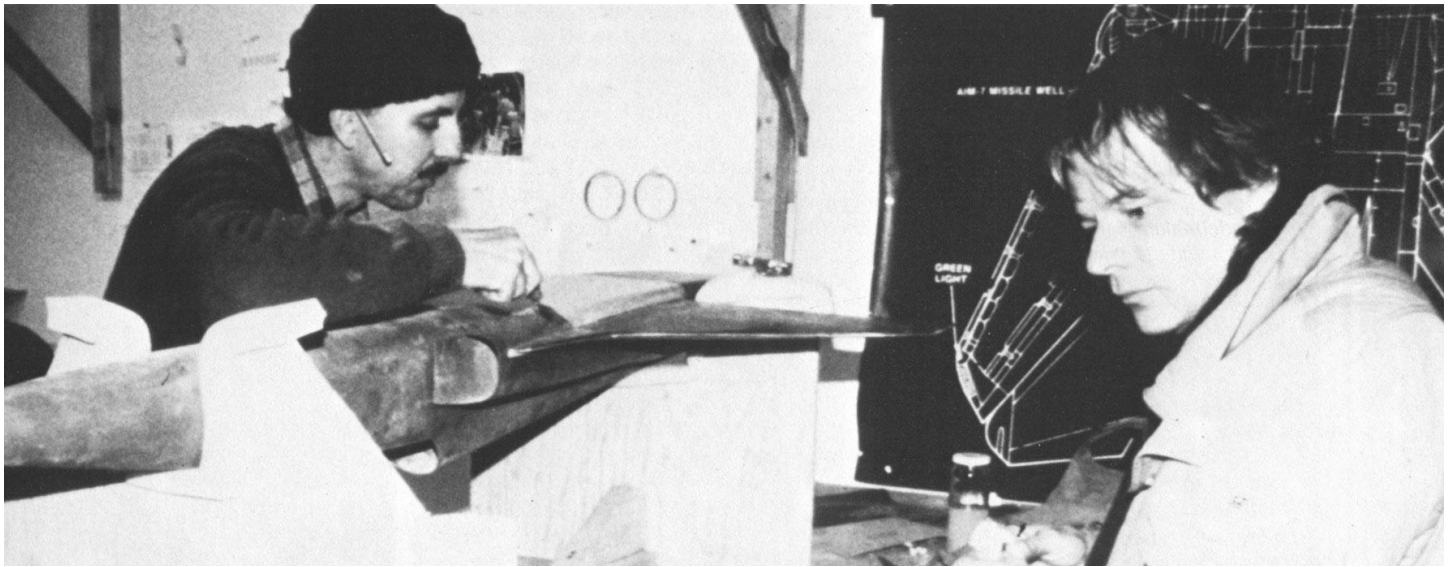


















didn't really have a need for, so we redressed them a bit and used them to supplement our own models."

"We cast our molds for the six-foot F-14 and F-5 models at the Apogee shop in Los Angeles," said USFX model shop supervisor David Sosalla. (Due to the unavailability of Russian-made aircraft for use by the live-action unit, aggressor MiGs were simulated by Navy F-5 Tigers painted black.) "The 'bucks' for the models — which are carved wooden forms — were rented from Larry Wolfe of Jet Hangar Hobbies and were made originally for radio control flying models. Since they had already been built, that was obviously the fastest way for us to get going. The F-14s were cast in very lightweight fiberglass. These fiberglass lay-ups were then sent to the USFX model shop in San Francisco where they were fitted with internal armatures and finely detailed. One major problem was that the fiberglass wing section lay-ups were warped in shipping, which made it difficult to join the two sections together. We ended up having to fill the castings with rigid foam, which helped give it structure from within. In general, after the internal structure and model mounts had been added, we joined the two sections together by running a bead of Ren-weld glue along the edges of the fiberglass shells and then bolting them into the molds to dry." Once the basic structure was complete, each model underwent meticulous detailing and painting to correspond precisely with the full-size planes being used in the live-action.

Even at six feet in length, the principal aircraft models were barely large enough to maintain scale in the real-world environment in which they were being photographed. "It's difficult both to hide the wires and not reveal the small scale of the models," said Rick Fichter. "When I got what I thought was the ideal lighting on the aircraft, we found that it gave away the scale. The sunlight hitting the plane at that angle for some reason invariably made the aircraft look like a model. Some of the most deliciously-lit shots had to be scratched because of that. We ended up going with a rimmed, back-type of lighting because Tony wanted a glitzy look and that seemed the best way to maintain our scale."

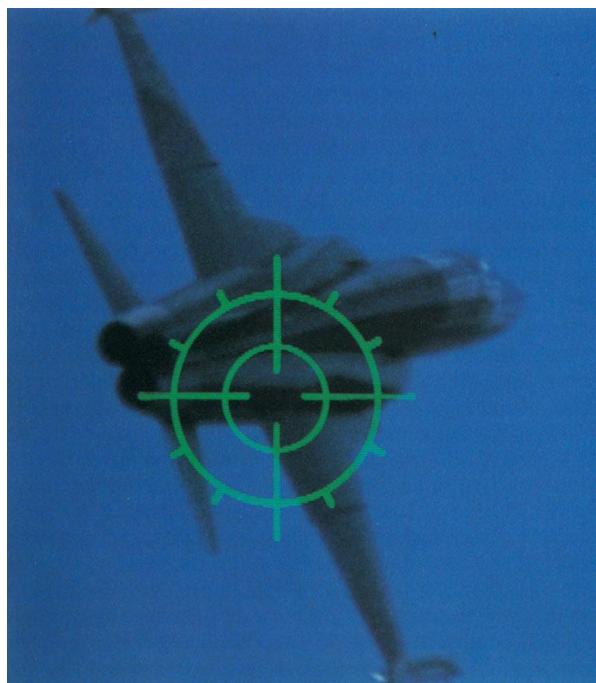
In one of the film's training sequences, Maverick's F-14 becomes caught in the jet wash of another plane, causing an engine flame-out that sends his plane into a flat spin from which it cannot recover. "Filming the flat spin for *Top Gun* was very similar to something we had done on *The Right Stuff*," recalled Gutierrez. "For a pilot, there's no way out because there's not enough air speed for the turbines of the engine to start. All the plane can do is spin parallel to the ground and drop straight down. Obviously, that was something the Navy wasn't going to stage for the film, so we were responsible for creating the sequence up to the moment the pilots eject from the plane. The ejection itself was created as a practical effect by the second unit under Allen Hall's supervision. They used a

For maximum effect, especially in situations where the models are used, the shots — attached to these rigid supports — impart a sense of motion to these aircraft, creating a vaporized effect through the model, so from a photographic point of view, the rotating camera moments the MiG is decontrolled. / aircraft falls from the sky as if models were fully alive.









addition, two specially isolated radio frequencies were used and there were also separate arming and ignition switches. Whenever a model was blown up, the wreckage was retrieved for possible salvage. But even though the receivers and servo motors were often still intact, they were never again employed for pyrotechnic purposes. Instead, they were returned to the model shop for other, less critical service.

The company was blessed with remarkably good weather during its three-week location shoot in Oakland. Blue skies were in abundance and the only clouds in sight were those created by USFX's battery of heavy-duty foggers that blanketed the area with a mineral oil vapor through which the miniature aircraft could be flown. "Only during our last few days did we have gray skies," Gutierrez recalled, "so we had to drag out some HMI lights and a large blue backing we had on hand for just such a possibility. For the most part, though, the weather was perfect. It *was* a bit windy from time to time, but that actually worked to our advantage in many of the shots because we were doing explosions that were supposed to be happening in a violent airstream anyway."

Peter Stolz' view of the wind was from a somewhat different perspective. "On one occasion, I was up on the manlift getting ready to launch a flaming model for one of our shots. Down below were the cameras and a safety crew consisting of some ten people ready with fire extinguishers and hoses in the event of a mishap. At ground level there was maybe a ten mile-an-hour breeze; but up at the top of our eighty-foot tower we had about a forty mile-an-hour wind roaring across the lift. The ground crew had no idea of the onslaught we were suffering topside. Up in the lift, I was standing with this flame- and smoke-laden model plane which was resting on a little ramp that resembled a diving board. The model was on tension straps made of bungee cords so that when we released it, it shot away from the manlift and into a net below — which it would usually, but not always, hit. It was pretty miserable up there in that wind with the smoke and flames and heat blowing in our faces."

Some of the shots called for a simulation of tracer fire from one plane to another. To achieve this effect, Stolz experimented with a special mortar rig he developed. "I tried to simulate the trajectory and look of tracer fire with what is known as 'simulated phosphorus' pellets. We tried to fire them across the frame around the model plane by means of a firing rig made with a series of mortar pipes mounted on two-by-fours clamped together. There were three banks of mortars wired randomly in groups of six or more, and we packed these mortars with very

*Self-propelled
missiles
F-14 and
into safe
off came
targeting
generate
animation
action ai
carefully
then con
with mo
elements
pyrotech
were em,
which or
MiGs has
by a Side
Working
plate shc
film site,
notted t*



addition, two specially isolated radio frequencies were used and there were also separate arming and ignition switches. Whenever a model was blown up, the wreckage was retrieved for possible salvage. But even though the receivers and servo motors were often still intact, they were never again employed for pyrotechnic purposes. Instead, they were returned to the model shop for other, less critical service.

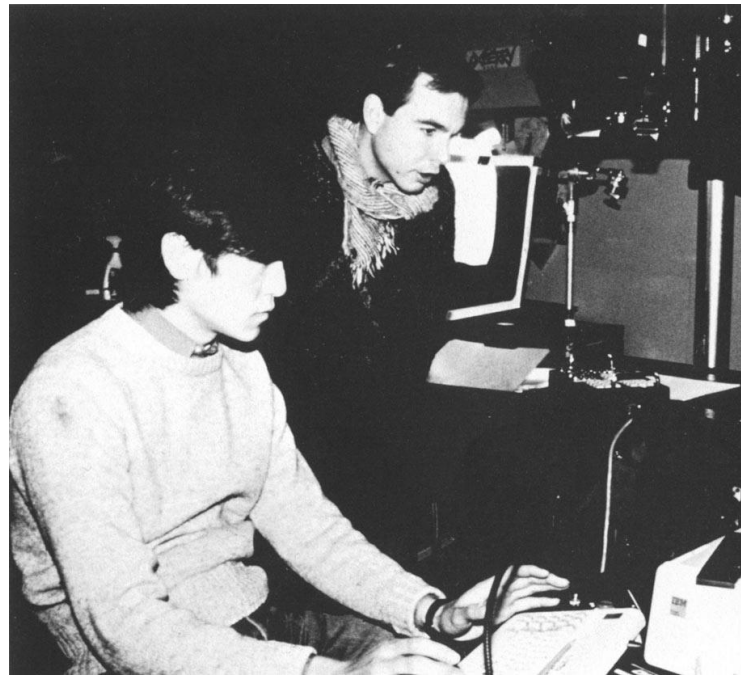
The company was blessed with remarkably good weather during its three-week location shoot in Oakland. Blue skies were in abundance and the only clouds in sight were those created by USFX's battery of heavy-duty foggers that blanketed the area with a mineral oil vapor through which the miniature aircraft could be flown. "Only during our last few days did we have gray skies," Gutierrez recalled, "so we had to drag out some HMI lights and a large blue backing we had on hand for just such a possibility. For the most part, though, the weather was perfect. It *was* a bit windy from time to time, but that actually worked to our advantage in many of the shots because we were doing explosions that were supposed to be happening in a violent airstream anyway."

Peter Stolz' view of the wind was from a somewhat different perspective. "On one occasion, I was up on the manlift getting ready to launch a flaming model for one of our shots. Down

densities of our matte elements to get them to look right."

Animation was also responsible for simulating the computerized 'heads-up' targeting displays projected onto the inside of F-14 canopies so that pilots can see their electronic instrumentation while still looking straight ahead. "Our 'heads-up' targeting displays required up to five elements per frame," said Groshelle. "First we rotoscoped all of the second unit aerial footage — all of the motions of the airplanes going through their maneuvers — and then we choreographed motion control camera moves on different pieces of artwork designed to simulate computer graphic displays. Quite a lot of testing was required to make it look as though the plane was trying to elude our little boxes and circles, but it was all done after-the-fact with static artwork. Once the displays were finished, we density-matted them over the aerial footage."

As with the pyrotechnic and model effects, the apparent realism of *Top Gun*'s animation offered a small, yet important, boost to the film's overall believability. Each of these elements — skillfully combined with heart-thumping live-action material — helped director Tony Scott and his producers serve up for moviegoing audiences a singular taste of the edge-of-your-seat excitement usually known only to fighter pilots. Gary Gutierrez and USFX had captured that same sort of excitement for *The Right Stuff*, so they were aware of the challenges facing them and drew upon past experience to meet new demands. The enormous popularity of *Top Gun* — far and away the year's boxoffice champion — and the fact that its miniature and animation work went by virtually unnoticed, proves that seamless special effects *can* be achieved without a multimillion dollar effects budget and an arsenal of computers. "At our company we have most of the bells and whistles that everyone else seems to have these days," Gutierrez concluded, "and I'm as appreciative as anyone when it comes to technological advances. But I think there's a tendency sometimes to latch onto a particular technology and try to use it in all circumstances. For me, satisfying the requirements of the film is more important than advancing the state of the art. Oftentimes it just isn't necessary to push the limits of technology. It's like vacuuming your carpets. How many times have you had a piece of lint that just wouldn't come loose — and yet you stood there running your vacuum cleaner over it and over it rather than simply reaching down and picking it up? Technology tends to do that to us. We become dependent upon it to the point where we overlook the obvious. There's no question that technology is great and that



densities of our matte elements to get them to look right.”

Animation was also responsible for simulating the computerized ‘heads-up’ targeting displays projected onto the inside of F-14 canopies so that pilots can see their electronic instrumentation while still looking straight ahead. “Our ‘heads-up’ targeting displays required up to five elements per frame,” said Groshelle. “First we rotoscoped all of the second unit aerial footage — all of the motions of the airplanes going through their maneuvers — and then we choreographed motion control camera moves on different pieces of artwork designed to simulate computer graphic displays. Quite a lot of testing was required to make it look as though the plane was trying to elude our little boxes and circles, but it was all done after-the-fact with static artwork. Once the displays were finished, we density-matted them over the aerial footage.”

As with the pyrotechnic and model effects, the apparent realism of *Top Gun*’s animation offered a small, yet important, boost to the film’s overall believability. Each of these elements — skillfully combined with heart-thumping live-action material — helped director Tony Scott and his producers serve up for moviegoing audiences a singular taste of the edge-of-your-seat excitement usually known only to fighter pilots. Gary Gutierrez and USFX had captured that same sort of excitement for *The*



